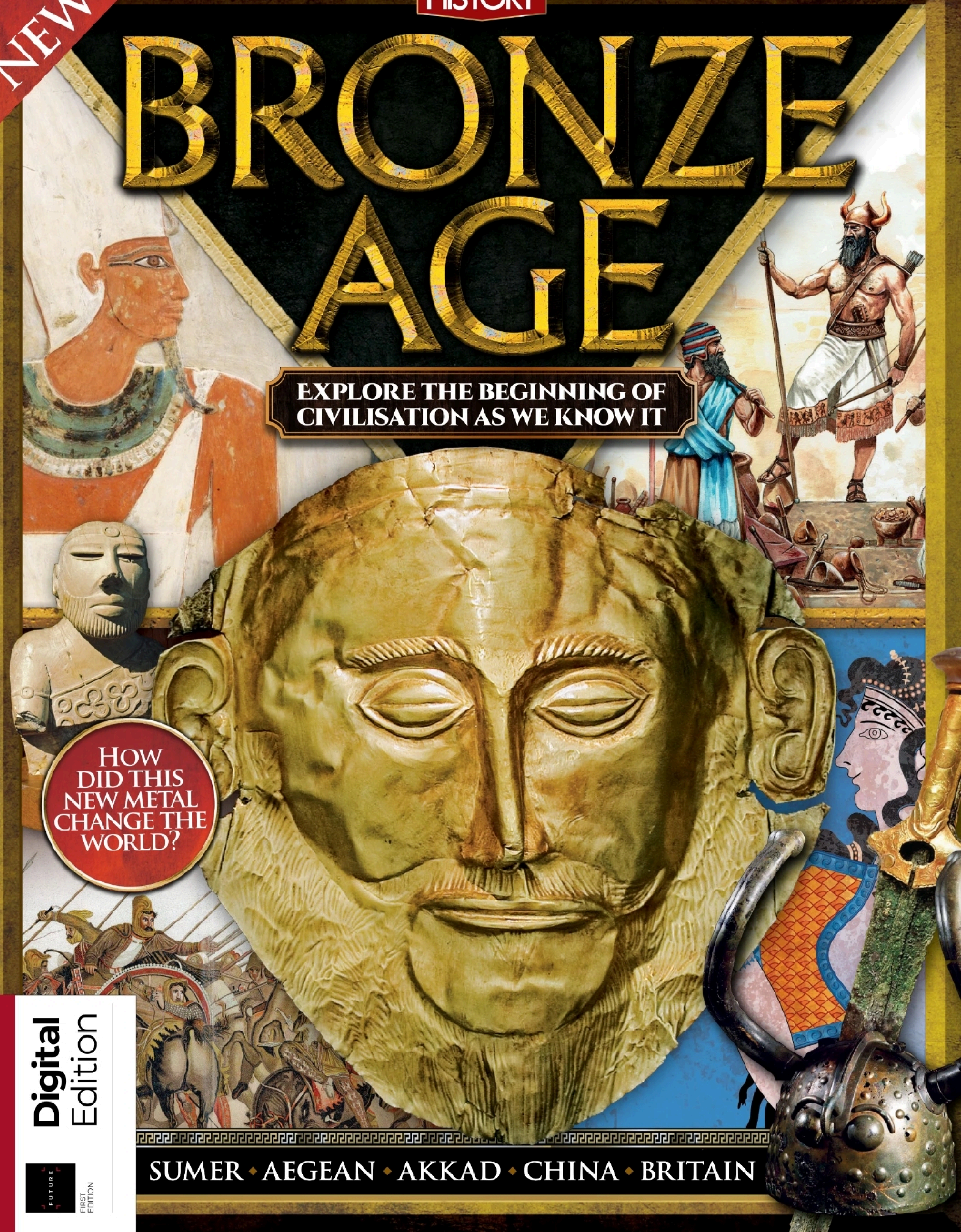
NEW

ALL ABOUT HISTORY

BRONZE AGE

EXPLORE THE BEGINNING OF CIVILISATION AS WE KNOW IT



HOW DID THIS NEW METAL CHANGE THE WORLD?

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WELCOME TO
BRONZE AGE

The Bronze Age is often seen as an age of mystery and magic, but it's also the age in which civilisation as we know it began. The discovery of bronze created something much more complex than an alloy of copper and tin: it created the technologies and trade networks needed to acquire and process those raw materials. It tamed horses, built sailing ships and wheeled vehicles to transport goods, brought people together in larger communities, and built walls and social structures around them; it created systems of writing so that they could keep tallies of trade and write letters to each other across bigger distances than many people had ever travelled before. The story of the Bronze Age is the story of how our world began, and you can discover everything we know about it inside these pages...

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BRONZE AGE

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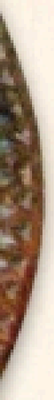

THE AGE OF BRONZE

The invention of bronze marked the moment humanity learned to create the tools and technology to change the world

Written by **Ben Gazur**

Bronze Age is a loaded term. Many are happy to use it as an insult to call something backwards. Yet the more we study it the more remarkable the Bronze Age seems as a moment of transition and of startling innovation. Bronze is definitely not a loser's metal.

There is no global consensus as to when the Bronze Age occurred. Bronze, an alloy of copper with arsenic or tin, was first produced in large quantities around 3300 BCE in Mesopotamia. In Britain, on the other hand, bronze only became a common material around 2100 BCE. When talking about the Bronze Age we must be aware that it happened in different place and at different times. Also, no one at the time realised they were living in the age of bronze; it is a term we have applied looking back on them.

Bronze was not the first metal to be used. It largely replaced the use of copper in tools and weapons. Copper is shiny and beautiful but also relatively soft and easily damaged. By mixing copper with other elements in precise proportions you can form bronze, which is far more durable. The skill of making bronze marks the passage of humanity from the Stone Age and into a period of much greater social complexity.

To examine the Bronze Age is to watch humanity evolve from small scale communities to the first true cities. The rarity of tin and its importance in crafting bronze would see networks of trade form that crossed continents and led to the first wave of globalisation. Alongside the developments in metallurgy would come other technological advances that allowed the creation of complex civilisation - as well as organised warfare for the first time.

By the time iron was first forged into tools, the Bronze Age had lasted for several millennia. Iron has many advantages over bronze but it did not fundamentally change how humanity behaved. Bronze had already shaped the course of our future and cast us in our current form as surely as a bronze worker thousands of years ago pouring the molten metal into a mould.

The casting mould for a bronze axe, found in Germany. Liquid bronze would be poured in to it

© Wiki; Wolfgang Sauber

TIMELINE

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DEFINING MOMENT

Bronze 5th millennium BCE

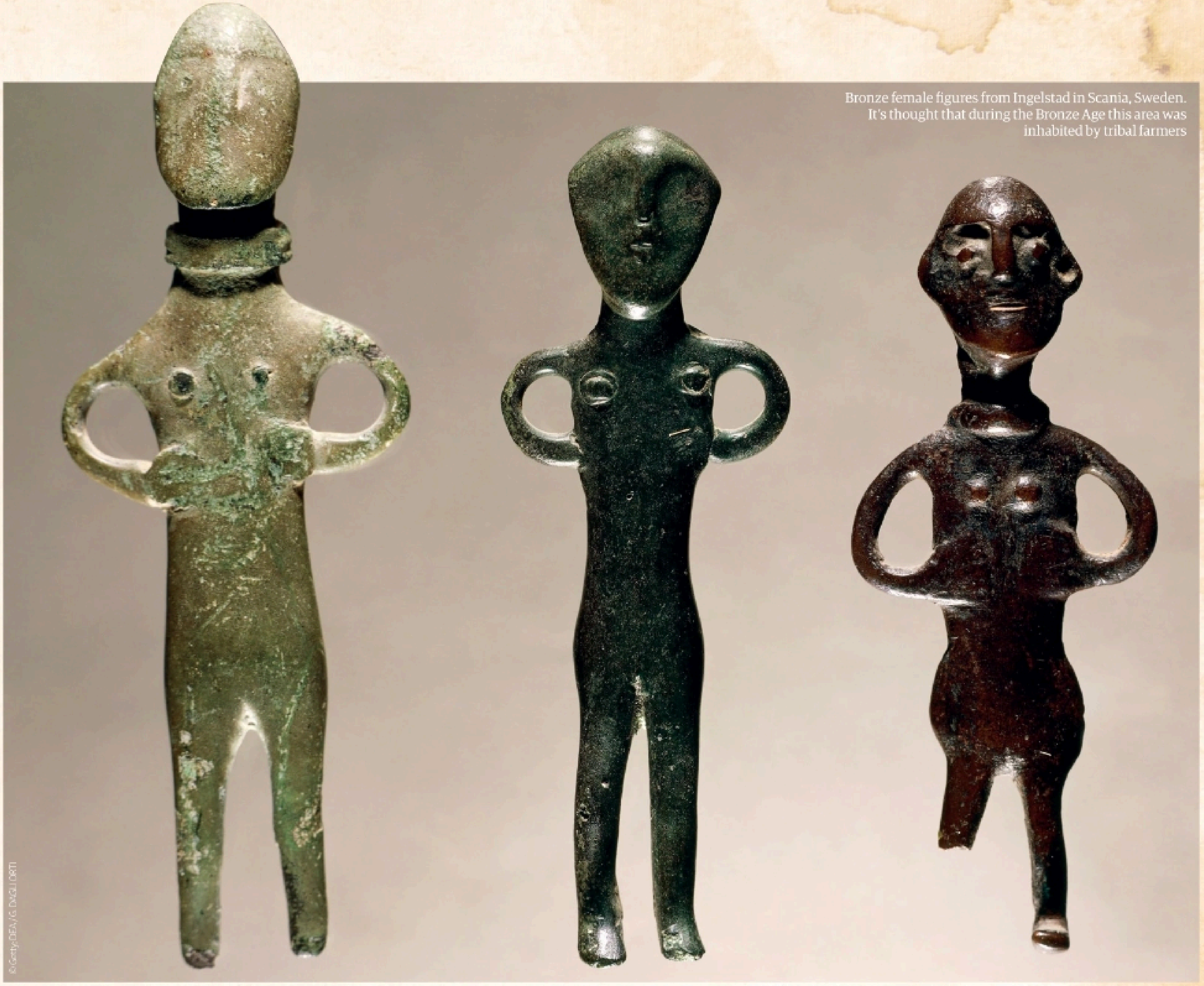
The first attempts to create a more durable metal than copper involved alloying it with arsenic, making arsenic bronze. Copper often exists naturally with arsenic in ores and so its discovery may have been accidental. As trade developed with areas containing tin, it was used instead to create bronze. The difficulties of sourcing tin and finding the correct ratio of copper to tin show a great amount of sophistication. Bronze was used to first create high status items like axes, daggers, and decorative items. As the technology spread, it allowed stronger tools to be made.

DEFINING MOMENT

Writing 3200 BCE

Long distance communication necessitated by trade required a means of recording language. Proto-writing is found in several regions, but in Sumer these pictograms developed into the written language known as cuneiform. These wedge-shaped markings could be easily made in wet clay and baked to produce durable copies of a text. Cuneiform could also be carved into stone with ease to set up lasting monuments. Writing allowed complex thoughts to be recorded for the first time, and communication between peoples and states was carried out over great distances. Historians have also benefited from these voices from the past.

- **Trade**
  Evidence exists of obsidian being traded in the Neolithic. Widespread exchange of natural and precious goods created complex trade webs that spurred innovation and brought scarce materials, such as tin, into new areas.
  Before 5th millennium BCE
- **Sea-going ships**
  Ships with sails are known from images in the Middle East and likely developed from the vessels used to transport goods up and down rivers. Sea trade vastly increased the speed of trade and the distances that could be travelled.
  5th millennium BCE
- **The wheel**
  The earliest wheels were solid wooden circles attached to axles and used to aid transport and agriculture. Centuries of trial and error were required to create wheels that turned freely and smoothly.
  4th millennium BCE
- **Domestication of the horse**
  Horses were first domesticated in the Eurasian Steppes. In the Middle East, wild onagers were used to pull carts and chariots until the modern horse replaced them, increasing the speed of land travel considerably.
  3500 BCE
- **Mathematics**
  To facilitate trade and build complex structures, a knowledge of mathematics is vital. The first mathematical treatises show a pragmatic use of number. The Sumerian use of a base-60 system remains with us in our minutes and hours.
  2000 BCE



Bronze female figures from Ingelstad in Scania, Sweden. It's thought that during the Bronze Age this area was inhabited by tribal farmers

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DEFINING MOMENT

Iron 1500 BCE

Iron is a difficult metal to purify and work with. The temperature needed to smelt it is very high and it must be beaten to strengthen it. Bronze is easier to make and can be cast in moulds. Iron ore is however much more common than copper or tin. At first iron was used only occasionally but as tin became difficult to obtain it rapidly replaced bronze in many of its uses. Different peoples began to use iron at different times. With the addition of carbon to iron, steel was created and this tougher material spelled the end of bronze.

Law
For society to exist rules must be enforced and this required the creation of law codes. The earliest law code was created by Ur-Nammu in Sumer and set out a system of justice and punishments for criminals.
2100 BCE

© Wiki/ Donald A. Mackenzie

Chariots
Chariots altered warfare forever. Offering a quick and mobile platform from which to attack enemy soldiers they allowed for rapid raids and sudden charges. The Battle of Kadesh involved 5,000 chariots.
2nd millennium BCE

Bronze Age Collapse
Across the Middle East and the Mediterranean, cities and civilisations underwent a mysterious decline. Many sites were abandoned forever or never recovered. The causes of this collapse are still hotly debated.
1200 BCE

The alphabet
Cuneiform writing and hieroglyphics require a huge amount of training to both read and write. With hundreds of signs to memorise, only the most skilled could use them. An alphabet allows simple phonetic recording of language instead.
1000 BCE

INVENTING THE BRONZE AGE

The Bronze Age had to be invented twice: first by ancient metallurgists and then by the archaeologists who rediscovered it

The ability to create cutting tools of bronze would change human history and help create the modern world

©Getty/Xavier DESMIER

Archaeologists will tell you that in their world "Context is king." Where an artefact is found and the items found alongside it are often just as important as the physical object itself. The relationships between finds can tell us a great deal about the past. One of the first to think about archaeology in this way was Christian Jürgensen Thomsen – father of the Bronze Age.

CURATING THE PAST

People have always been fascinated by the past. The Roman statesman Cicero went looking for the lost and forgotten tomb of the mathematician Archimedes in 75 BCE while in the 2nd century CE Pausanias wrote ten books describing Greece and the ancient sites that could be found there. His work was used as a guide for hundreds of years for those seeking out the past.

Ancient objects were often venerated simply because of their age even when their meaning had been lost. The treasures of Sainte Chapelle in France included a large Roman carved cameo showing the Julio-Claudian imperial family. Its church guardians constructed elaborate Christian readings of the image without knowing exactly what it was.

Antiquarians of the Enlightenment collected all manner of artefacts to place in their cabinets of curiosity. Stone axes might sit alongside ancient pottery, stuffed animals, and fossils. Little effort was made to systematise these heterogeneous collections of stuff. CJ Thomsen was among the first to try and disentangle the knots of history from archaeological finds.

THE THREE AGES

Thomsen was tasked with organising the artefacts owned by the Danish Royal Commission for the Preservation of Antiquities, later putting them on display in what would become the national museum. It was common at the time for museums to simply place items together depending on the material they were made from and how beautiful they were. Thomsen decided to do something different with his antiquities.

Without ever going out into the field to dig for finds, Thomsen examined which artefacts in the museum had been found together. His work showed that alongside stone tools you were likely to find pottery, amber, and bone. When bronze weapons and tools were found then iron was absent. It seemed to Thomsen that there were clear periods that could be defined from the material they used for objects that cut. His essay *Brief Outlook on Monuments and Antiquities from the Nordic Past* explained that from his work he could discern three distinct periods of Nordic prehistory. "The Age of Stone, or that period when weapons and implements were made of stone, wood, bone, or some such material, and during which very little or nothing at all was known of metals… The Age of Bronze, in which weapons and cutting implements were made of copper or bronze, and nothing at all, or but very little was known of iron or silver… The Age of Iron is the third and last period of the heathen times, in which iron was used for those articles to which that metal is eminently suited, and in the fabrication of which it came to be employed as a substitute for bronze." This categorisation of prehistory into Stone, Bronze, and Iron has been found to hold true for humanity's earliest days in many places.Others had proposed such three-age system before but it was Thomsen who gave it widespread appeal by physically showing it with evidence. On his coat of arms Thomsen included the motto "The objects first, then the writings."

BRONZE AGE TECHNOLOGY

The Bronze Age, then, is a period defined by the technology that people used. There is therefore no single definition of when the Bronze Age occurred, if it occurred at all. In northern Europe, where Thomsen took his evidence from, the age when bronze was the dominant material lasted from around 1700-500 BCE. In Mesopotamia, however, the Bronze Age is considered to have begun around 3500 BCE and ended around 1100 BCE. This is because the technology required to create bronze, and later to smelt the iron that would replace it, was only slowly adopted in some locations or was impossible due to a lack of the necessary raw materials.

Not every culture followed the Stone, Bronze, Iron Age path of development. In the Americas bronze was certainly created by the Moche people around 200 BCE, but it remained limited to decorative and high status items. Because of the radically different conditions in the Americas, bronze was inherently of less use to the peoples who lived there than it was to those in Eurasia. It is possible that the Spanish conquests cut off the chance of a true American Bronze Age emerging but it seems likely their technology would have evolved in different ways. In Australia and New Zealand, stone was the ultimate cutting tool and remained in use in indigenous cultures until the 20th century.

When we use the term Bronze Age, then, we are describing a wide geographical area and millennia of time. What unites the people who lived in this age was the ability to smelt metals from ores, create an alloy of copper and tin, and cast this into useful objects. Yet bronze was not the only material they had that they could use. Sometimes stone or organic materials were just as important, even if bronze was shinier.

CJ Thomsen changed the way that museums displayed artefacts, thanks to his Bronze Age research

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Much of the technology available to Bronze Age people did not come directly from the availability of bronze. Irrigation was more vital to the emergence of the first cities in Mesopotamia, Egypt, and the Indus Valley than any metal. The wheel, made of wood, transformed agriculture and led to innovation in warfare as chariots came to dominate battlefields. Writing could be used to record and share all sorts of information. As we shall see, the Bronze Age was one of the most innovative eras in human history, and bronze was just one of its great discoveries.

THE AGE OF GLASS

Some found CJ Thomsen's three-age system of prehistory to be too neat. They mockingly asked him why he did not include a Glass Age in his theory. Thomsen had a ready answer for his detractors – glass was found alongside artefacts from the Stone, Bronze, and Iron Ages.

When Thomsen grouped together his finds by where they were found, he discovered that glass beads were found with stone, bronze, and iron tools. Glass bowls, however, were only found alongside iron discoveries and offered further confirmation that the Iron Age occurred after the Bronze as bowls are much more difficult to manufacture.

Glass was likely discovered in Mesopotamia around 3600 BCE, with small beads being the first objects made. These glass beads were transported into areas, such as northern Europe, which were still in their Stone Age. Later glass-workers were able to create large and beautiful vessels. The ability to melt glass requires high temperatures and complex ingredient mixing. The technology that allowed the creation of bronze may have spurred on the creation of glass, and glass furnaces may have aided in the eventual smelting of iron. We may yet be living in the age of glass.

Glass was a commodity valued for its beauty in the ancient world with glass jewellery and other high status objects traded widely

© Wiki/ Vassil

IMAGINING THE BRONZE AGE

Was the Bronze Age a step up for humanity or just another fall further from perfection? Writers of antiquity had very different views

It is not only modern archaeologists who look back on the Bronze Age with wonder. The ancient Greeks who saw the towering walls and heavy blocks of Mycenaean monuments could not believe they were built by men at all. For them these were the remains of structures erected by the Cyclopes of legend. To reconstruct their past they relied on mythology to make sense of the fragmentary remains and artefacts they found. Still, sometimes they came remarkably close to the truth.

People often look back to the past as a Golden Age when everything was perfect, and this has shaped how many see prehistory

© Wiki ; Alte Pinakothek Collection

"Were the ancient writers recording a partially remembered tale of the invention of bronze, or was it lucky supposition?"

THE DESCENT OF MAN

One of the earliest extant works of Greek literature is Hesiod's *Works and Days*. This poem, probably written around 700 BCE, gives a vivid view into what life was like in early Greece. Addressed to Hesiod's layabout brother, the poem describes many aspects of farming. Perseus skips work and listens to debates in the marketplace so Hesiod chides him, at some length, that he should be hard at work on the farm. The gods have not made life easy for mortals and Hesiod tells the story of how humanity came to have such hard lives.

Five ages of humanity are listed by Hesiod. The first race to be created were the Golden people who lived like gods. "Like the gods they lived with happy hearts, untouched by work or sorrow," and "vile old age appeared not." When death came on these people it was as soft as sleep and they lived on as spirits of good fortune.

The next race the gods created were the Silver ones. These spent a childhood of a hundred years at home before maturing. As adults their lives were nasty, brutish, and short because they quarrelled with one another. Worse, from the point of view of Zeus, was the fact they did not sacrifice to the gods. Zeus buried them under the ground.

Next came the Bronze race who "sprung from the ash tree." These people were lesser in every way to the Silver but were "strange and full of power." They lived for warfare and did not bother with agriculture. We are told "Their weapons were bronze, their houses bronze, their tools were bronze: black iron was not known." Given their bellicose nature this race died by their own hands, leaving only their bronze artefacts behind them.

Following the Bronze age was the Heroic race of demi-gods whose achievements live on in epic tales and song. They were brave and mighty and did great things. When these heroes died they went to live on the Isle of the Blessed, leaving this world of cares behind.

Then Hesiod comes to his current, Iron, age. "I wish I were not of this race, that I had died before, or had not yet been born." Gone are the great old days and now men must work unceasingly by day and waste away as they sleep at night. The poem then foresees the destruction of this Iron Age and its replacement with a still worse one. For Hesiod, then, the story of mankind is one of an endless fall from grace.

ON THE NATURE OF THINGS

Other classical writers took a quite different view from Hesiod's pessimistic reading of humanity's fate. While Hesiod uses a metaphorical terminology for the Gold and Silver Ages he realises that bronze really was used by the people who came before the (then) current Iron Age. For the Roman poet Lucretius this fact was a key historical realisation.

Titus Lucretius Carus lived in the first century BCE and wrote a long poem explaining the philosophy of the Epicureans. His *On the Nature of Things* tackled everything from atomic theory to love. He accurately described Brownian Motion hundreds of years before it was given that name and he created a three-age history of humanity long before it was fully explored.

For Lucretius the first age of mankind occurred after they naturally sprang up alongside other species. These first people were living in a state of nature. "No one spent his strength in guiding the curved plough." They lived on fruit and berries as the Earth provided them. Yet it was a rough age, as they had no sense of community or the common

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THE PLATONIC SOULS

Like Hesiod, other Greek writers saw the metaphorical value of metals in describing humanity. In Plato's *Republic* he explains that to get people to take their proper place in society, and be content there, they must be told a noble lie about their origins. In the Republic, people will be told they were formed from soil by the gods and into each of them was placed a soul made from Gold, Silver, or Bronze.

The Golden-souled are those destined to rule over all other people. They will be what Plato called Philosopher Kings and spend their time in contemplation as well as being forced to wield the ruling power in their society.

The Silver souls are the auxiliaries who make up the warrior caste of the Republic. Given a valuable soul, but not one of the same calibre as the rulers, the auxiliaries are bound to support their rulers without wishing to overthrow them.

The majority of people in the Republic, however, have a more pedestrian soul of Bronze. These are the doughty workers of the community and while they cannot aim to be leaders they can hope to do honest labour. You would not sully a golden plough by using it in the dirt, would you?

LEFT: While people with Bronze souls produced the goods for civilisation, the Gold-souled discussed what exactly the nature of goodness was

good. These people fought with stone weapons and wooden clubs. It was fire that changed things. With fire people began to live together in villages and build lasting structures. Lucretius tells us that after fire ripped through a forest the peoples would find pools of metal that had been roasted from the rocks. With these came the next developments in humanity.

Copper and bronze were discovered first, according to both Lucretius and modern archaeology, and allowed the first true wars. "The earliest weapons were hands, nails and teeth. Next came stones and branches wrenched from trees, and fire and flame as soon as these were discovered. Then men learnt to use tough iron and copper. With copper they tilled the soil. With copper they whipped up the clashing waves of war... Then by slow degrees the iron sword came to the fore; the bronze sickle fell into disrepute; the ploughman began to cleave the earth with iron."

METAMORPHOSIS

Ovid's *Metamorphosis* gives a more mixed view of human prehistory. For Ovid there had been four ages of mankind. The Golden Age was one of justice and bounty when "secure a happy multitude enjoyed repose." The following Silver Age saw the coming of farming and the building of the first towns. Next came the Bronze Age "when cruel people were inclined to arms," but they at least reverenced the gods. The final age was Iron, which brought with it successes like navigation, mining, and the rise of nations, but also saw humanity succumb to greed, brutal wars, and impiety.

Were the ancient writers recording a partially remembered tale of the invention of bronze and iron, or was it merely lucky supposition? Either way it shows our shared drive to know more about the distant past, and the drive to organise our knowledge and understanding of the world.

While Hesiod saw the Iron age as a degenerate and broken one, Lucretius viewed it as the latest summit of humanity's achievements

© Wiki; Scan by Hans-Jürgen Günther

DISCOVERING THE BRONZE AGE

Understanding the Bronze Age has required piecing together thousands of discoveries, and more are being made all the time

The Behistun Inscription allowed for the decipherment of ancient cuneiform texts, and required scholars to hang from ropes to record it

© Wiki/ PersianDutchNetwork

In the 16th century it was common for people to find 'thunderstones' left behind after lighting strikes. These stones were often axe or arrow-shaped with fine cutting edges. Those interested in natural philosophy collected them and were in no doubt that these thunderstones were simply the natural by-product of a storm. Today we know them to be tools crafted by ancient people. They resemble arrowheads because they are arrowheads. To get to our modern understanding of the past required a new way of conceiving the world.

THE BIRTH OF ARCHAEOLOGY

It was contact with peoples in the New World who still used stone arrowheads that allowed Europeans to identify thunderstones correctly for the first time. Broadened horizons of knowledge began to piece together much of the evidence available at the time. We have already seen how by grouping archaeological finds together CJ Thomsen was able to use empirical evidence to show that there was indeed a sequence of Stone, Bronze, and Iron Ages in northern Europe. The 19th century saw the application of science to history in a way that had never occurred before.

Antiquarians digging up artefacts began to place increasing importance on the location of their discoveries. While some adventurous, perhaps unscrupulous diggers, like Heinrich Schliemann at Troy, often tunnelled straight to the most glittering artefacts, others developed stratigraphy as a way of dating their finds. By examining the layers above and below an archaeological site a lot of information can be gained about its age and what was happening there.

As Thomsen's theories of a Bronze Age preceding an Iron Age spread, archaeologists began to look for evidence of it in places outside of the Nordic countries. Wherever they looked in Eurasia the same pattern of stratification emerged. Deeper, earlier, layers contained stone tools, above them in more recent deposits came copper and bronze artefacts, and iron then replaced bronze as the metal of choice of cutting implements.

Only later with the ability to relatively date objects did it become clear that the distribution of bronze and iron technology occurred in different places at different times. But wherever iron became common it inevitably spelled the end of the use of bronze.

READING THE PAST

The physical remains of a people can tell us lots about them, but they can only mutely inform our theories by offering evidence. The best way to find out about a person is to ask them questions, and the Bronze Age is the first in human history where we can directly engage with how people of the past thought. This is because the Bronze Age saw the birth of writing.

Across the Middle East there were vast numbers of enigmatic writings available to historians, but no way of reading them. Egypt was covered with hieroglyphics on almost every surface, and the tiny impressions of cuneiform texts could be found everywhere in Mesopotamia. In 1799 the Rosetta Stone was discovered, which finally allowed Egyptian hieroglyphics to be cracked. Bearing the same inscription in Greek, demotic Egyptian, and hieroglyphs, by comparing the hieroglyphs to the other sections it became possible to finally read hieroglyphics.

Texts dating back to 3000 BCE could now be read in Egypt, taking us back to the beginning of the Bronze Age there. In Mesopotamia, the cuneiform texts began to be intelligible after Henry Rawlinson climbed the cliffs at Behistun to record the trilingual inscription that Darius the Great had set into the rock face there. With other finds likes the Ugaritic texts and the records of the Hittite Empire we have gained many first-hand accounts of what life was like in the Bronze Age.

Without these texts we would have no idea of the complex diplomacy that flourished in the Middle Eastern Bronze Age. We have a letter from the king of the Hittites to the Egyptian pharaoh asking "Why, my brother, have you held back the shipments (of gifts) that your father was sending to me, when he was alive?" Nothing would remain of the complex treaties kings signed with each other that dealt with matters such as what to do if cattle crossed from one realm to another. More importantly we would lack any insight into the mythology and religion that helped ancient peoples make sense of their world.

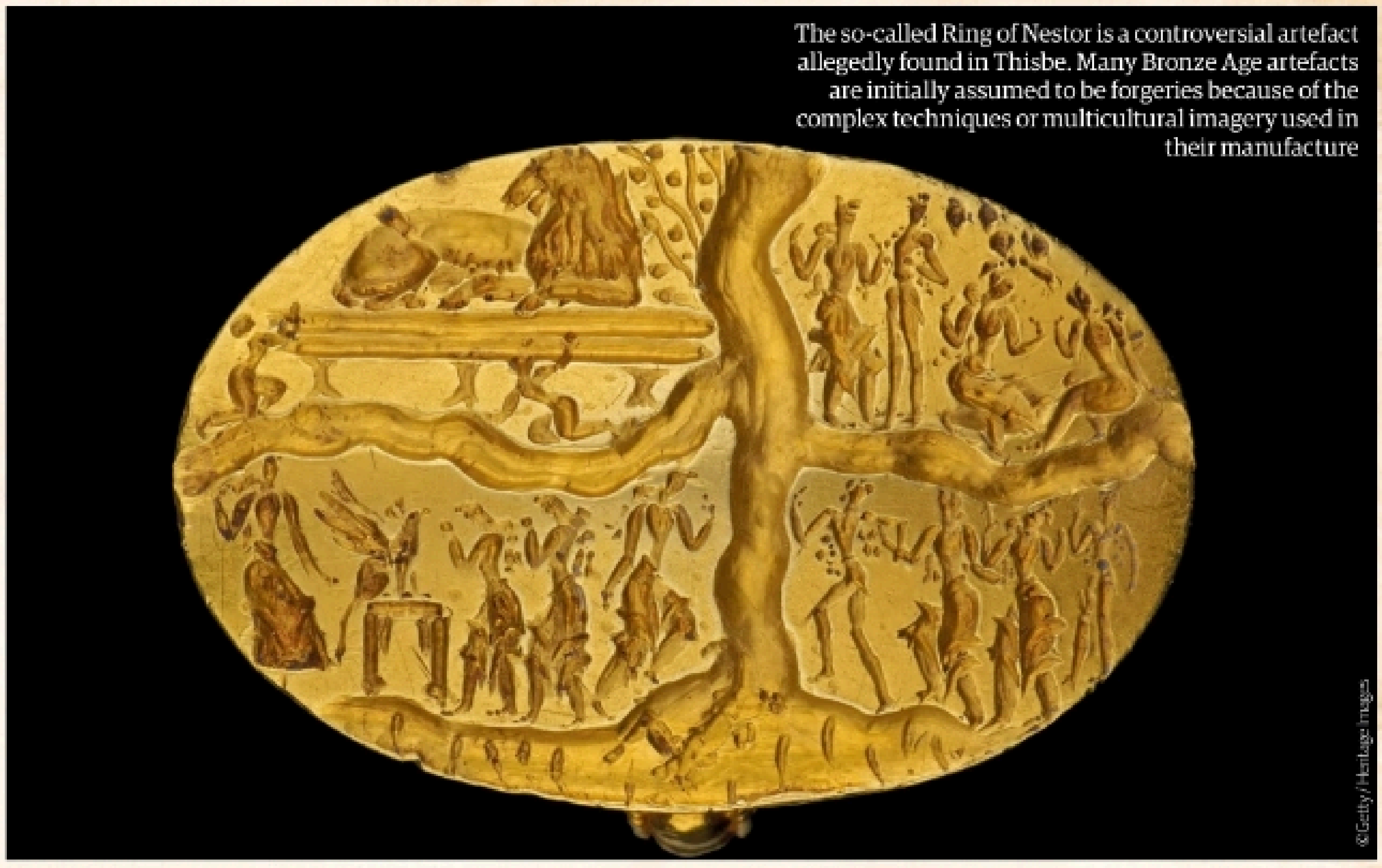
A GLOBAL SYSTEM OF HISTORY

The discovery of the Bronze Age has never truly stopped. Every year new findings help to finesse our knowledge of Bronze Age life. These can be as startling as shipwrecks that completely change our ideas about trade in the ancient world, or as humble as ancient toilets that reveal what parasites riddled our ancestors.

Piecing together all the findings is how we are able to recreate the ancient world. It may take specialists to read forgotten languages and trained archaeologists to uncover artefacts, but only by bringing together all our knowledge can we get a rounded view of this exciting period. The Bronze Age was therefore not just an age of metal but one in which real people lived and died. We know they travelled long distances, came together to create great monuments, shaped the lands they lived in to make their fields fruitful, and formed great civilisations that still amaze us today.

We also know that as individuals they were as real as any of us today. A Bronze Age burial of a young man and woman aged around 16 years old shows how the two were placed lovingly in the earth with precious goods. Inside their grave the two had been positioned so that they looked directly into each other's eyes.

If we are to understand the Bronze Age we must take into account everything we know and can learn about it, from the far-reaching trade networks to the beliefs that followed our ancestors into their graves. That is what makes Bronze Age history such a fascinating subject.


The so-called Ring of Nestor is a controversial artefact allegedly found in Thisbe. Many Bronze Age artefacts are initially assumed to be forgeries because of the complex techniques or multicultural imagery used in their manufacture

© Getty / Heritage Images

European antiquarians saw farm animals living beside grand ruins and began the process of rediscovering their history

© Wiki Source: Web Gallery of Art

EARLY ARCHAEOLOGISTS

One of the first people we know who took an interest in archaeology was King Nabonidus of the Neo-Babylonian empire. In his attempts to rebuild temples he had them excavated and their foundations examined to try to determine who first built them and when. The temple of the Sun god was first erected by King Naram-Sin, he discovered, and Nabonidus dated his reign to 3,200 years before his own. We now know that this dating was off nearly 1000 years but it was still impressive for the time.

In China around 1000 CE Confucian scholars looked to the past to ensure state religious practices were performed correctly. Others at the time thought that the best reason to study antiquities was to learn from them as their ancestors had achieved things that they were no longer capable of.

Europeans studying history before the birth of scientific archaeology busied themselves with recording the ruins of the Greeks and Romans that dotted the landscape. In 1420, Poggio Bracciolini looked down on the ancient forum of Rome and saw only cows grazing on what was now called Campo Vaccino and decided to recover the lost glories of what was once the Eternal City.

TECHNOLOGY

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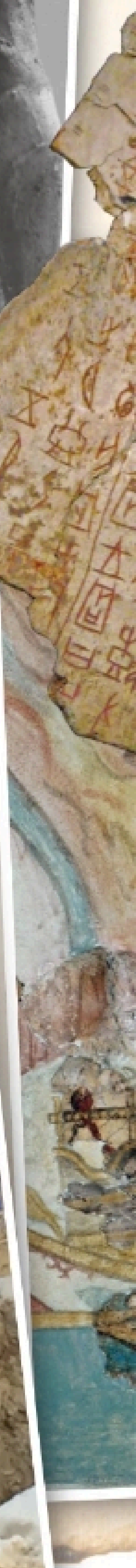

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BEFORE THE BRONZE AGE

The transitional period at the end of the Neolithic was a mysterious and exciting era on the brink of a technological and cultural revolution

Written by April Madden

The massive technological innovations of the Bronze Age didn't arise in a vacuum. It can be tempting to think of the inception of metalworking as a sudden jolt that shook Stone Age society to its core, but it was in fact the next stage in a process that had begun centuries beforehand.

The anthropological three-age system is divided into a trinity of evolving technologies, starting with the flint tools of our earliest modern-human ancestors and progressing to the use of bronze and then iron. But the 'Stone Age' itself is something of a broad term, and the primitive cavemen of the popular imagination are nothing like the (sometimes surprisingly sophisticated) people who actually lived in it. For a start, there were several eras within the Stone Age, encompassing many centuries. These are the Paleolithic, Epipaleolithic, Mesolithic, and Neolithic – the period in which humans adopted agriculture. At this point, many human communities made the switch from a nomadic hunter-gatherer lifestyle to a settled agrarian one, building small settlements, cultivating crops and herding animals. From such small beginnings, it can seem like the Bronze Age is an inexplicably swift and major leap forward. But there is another period, one that straddles the gap between the mysteries of prehistory and our more solid knowledge of history. It's a period of what's known as 'proto-history' – an era in which some civilisations had writing and some didn't, and those who had recorded some vital historical details about those who hadn't. This liminal, interstitial era at the end of the Neolithic, immediately before the Bronze Age began, is known variously as the Chalcolithic or Eneolithic: the Age of Copper.

The Belovode archaeological site on Mount Rudnik in Serbia contains the earliest securely dated evidence for deliberate copper smelting. Could its copper smiths have been part of a mysterious, technologically advanced culture that swept through Europe and Asia during the Eneolithic?

Russian folklore tells of a place in the mythical Kingdom of Opona, a utopian earthly paradise at the edge of the Earth, where the inhabitants were all happy, healthy, well-fed and well-off. This mystical land was known as Belovode, which is also the name of an archaeological site on Mount Rudnik ('mine') in Serbia. Home to Illyrians, Celts, Romans and Slavs over the centuries, amid the legends of ancient castles and cursed queens that litter its beech-clad slopes, Belovode contains the earliest securely dated evidence for high-temperature copper smelting in the world, from around 5000 BCE.

Smelting is the process of heating metal-bearing ore to extract the metal within. We know that the first metals to be deliberately smelted were tin and lead, thanks to some cast lead beads found at Çatal Höyük in Turkey that date to at least 6500 BCE. This predates writing by around 3500 years, so we don't know anything about how or why this innovation arose. What we do know is that other cultures across the ancient Near East soon began experimenting with smelting too: a lead bangle found in Iraq dates to around the same time as the Turkish beads. Lead is relatively rare in Iraq, but we can't say for sure whether the material and technology were transported and traded, or if this instance was an independent discovery. A theoretical argument could be made for the beginnings of trade: the Copper Age is the period during which the wheel was invented and the horse domesticated; both innovations eventually

> "This era at the end of the Neolithic, immediately before the Bronze Age began, is known variously as the Chalcolithic or Eneolithic: the Age of Copper"

The discovery that ore could be heated to extract metal, which could be cold-hammered, cast, or forged, was a Copper Age revelation that paved the way for the Bronze Age

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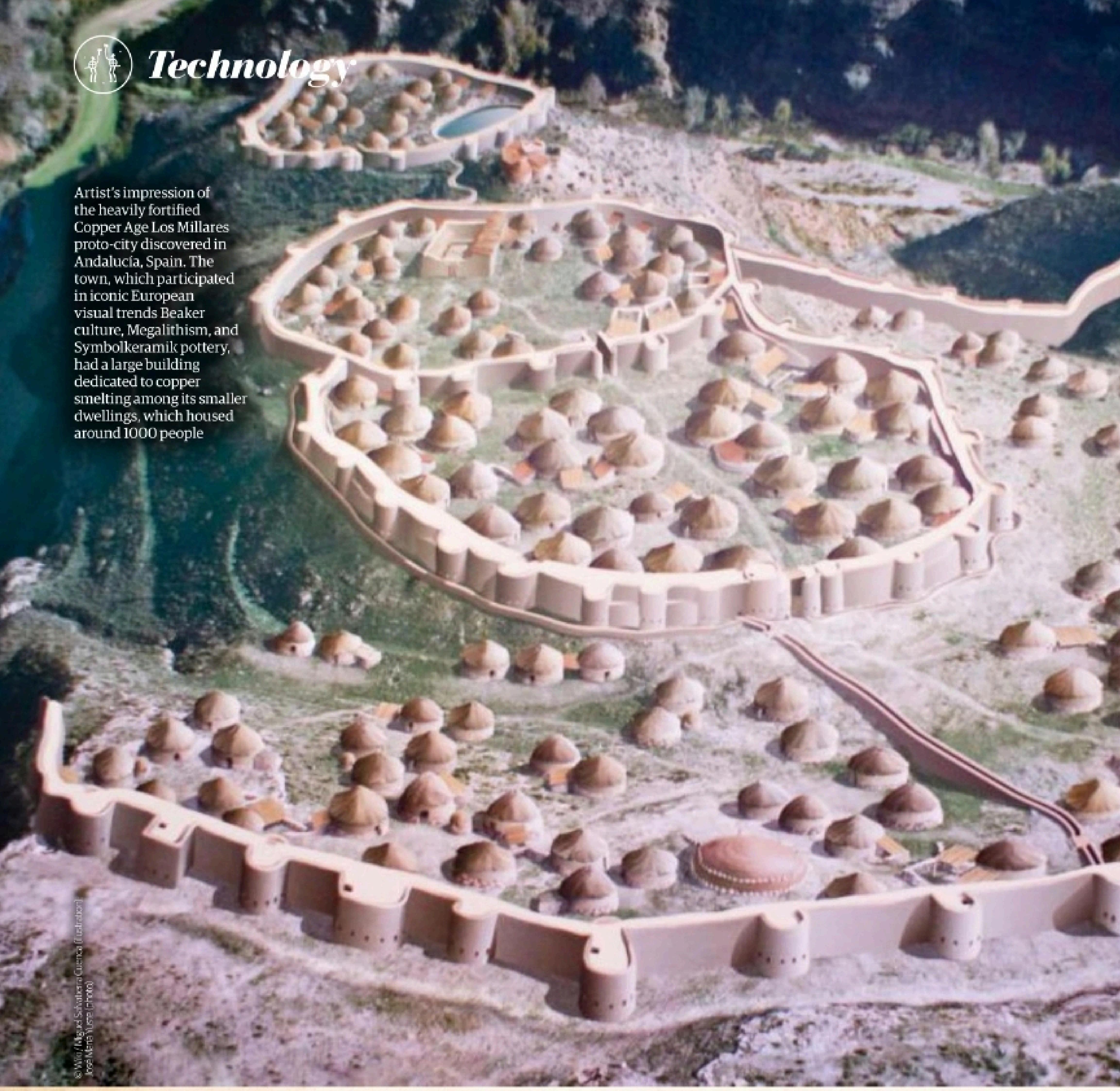

Artist's impression of the heavily fortified Copper Age Los Millares proto-city discovered in Andalucía, Spain. The town, which participated in iconic European visual trends Beaker culture, Megalithism, and Symbolkeramik pottery, had a large building dedicated to copper smelting among its smaller dwellings, which housed around 1000 people

© Wiki / Miguel Salvatierra Cuenca (illustration) José María Yuste (photo)

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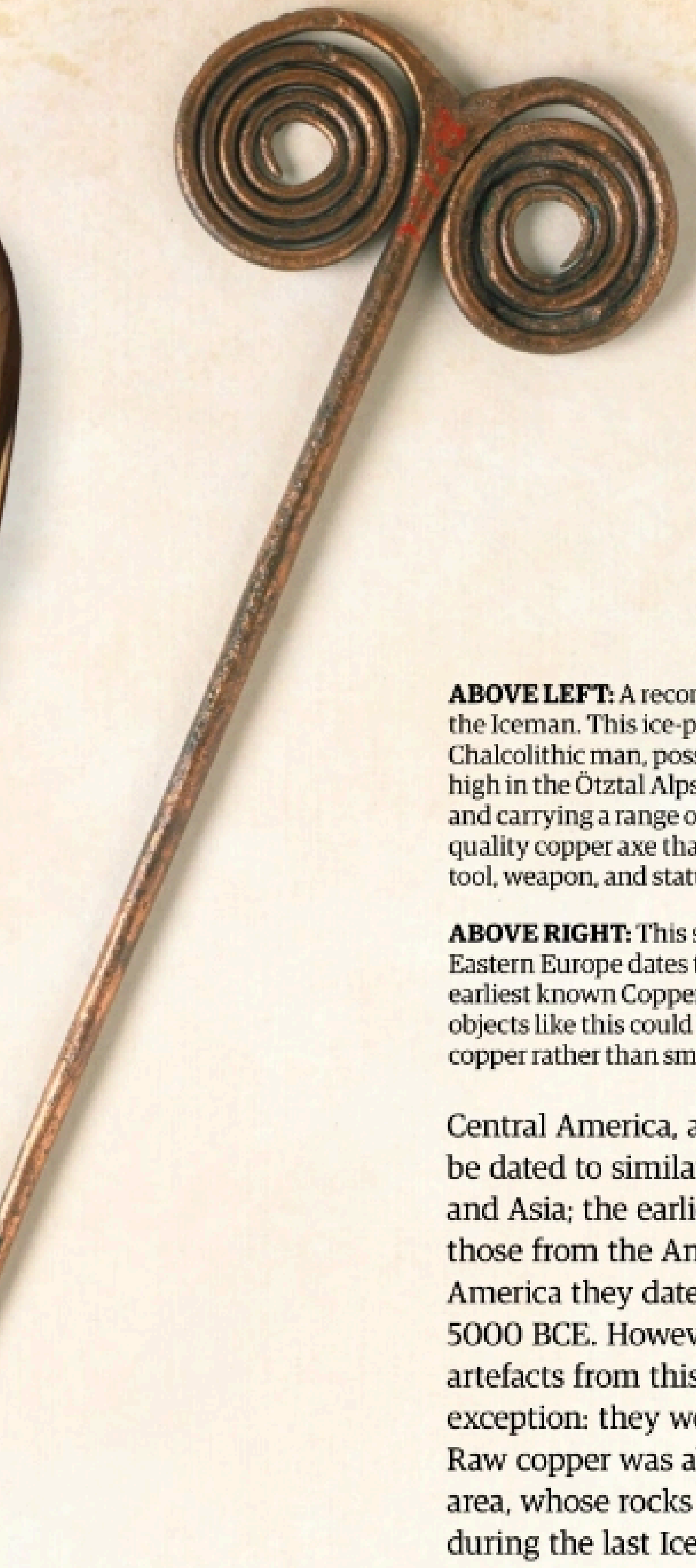
"A period of pre-Bronze Age climate change caused significant movements of nomadic herders, which led to linguistic, cultural and technological interchanges"

made goods easier to transport and trade over larger distances.

Tin and lead are soft metals – they can be liquified over the heat of a hearth or campfire – which makes them easy to smelt, even accidentally, but unsuitable for many of the uses that eventually saw metal replace stone: the creation of tools and weapons. Copper, on the other hand, requires a smelting temperature that's around 200 degrees Celsius higher than an ordinary wood fire can produce. We don't know how those first copper smiths achieved the requisite heat: the theory is by using pottery kilns, which can get up to a much higher temperature. We know that there were significant Neolithic pottery cultures in the times and places where the earliest smelted copper artefacts have been found, so the kiln hypothesis is our current best guess. Pottery culture certainly affected other game-changing innovations in the Copper Age; the invention of the potter's wheel predates that of the wheeled vehicle by at least several centuries. The first known writing – the cuneiform of ancient Sumer (now Iraq) – was inscribed into tablets of clay.

The copper smiths of Eneolithic Belovode were almost certainly speakers of a variant of the Proto-Indo-European language, the common ancestor of many Old World tongues and cultures. According to the Kurgan Hypothesis, originally formulated by archaeologist Marija Gimbutas in the 1950s, the speakers of Proto-Indo-European swept into and across Europe and Asia from the Pontic-Caspian steppe (part of both Russia and southern Ukraine) from the 6th millennium BCE onwards. This theory was further refined by anthropologist David W Anthony in 2007 with the publication of his book *The Horse, the Wheel, and Language: How Bronze-Age Riders from the Eurasian Steppes Shaped the Modern World.* Anthony's theory describes how a period of pre-Bronze Age climate change caused significant movements of early nomadic herders, which led to linguistic, cultural and technological interchanges between different groups. These herders were the likeliest candidates for the earliest domestication of the horse, but the wider geographical ranges of the highly mobile nomadic groups created by horse domestication caused increased instances of



ABOVE LEFT: A reconstruction of the copper axe of Ötzi the Iceman. This ice-preserved corpse of a murdered late Chalcolithic man, possibly a copper-ore prospector, was found high in the Ötztal Alps in 1991. He was clothed, provisioned and carrying a range of practical objects, including a high-quality copper axe that may have had a threefold function as a tool, weapon, and status symbol

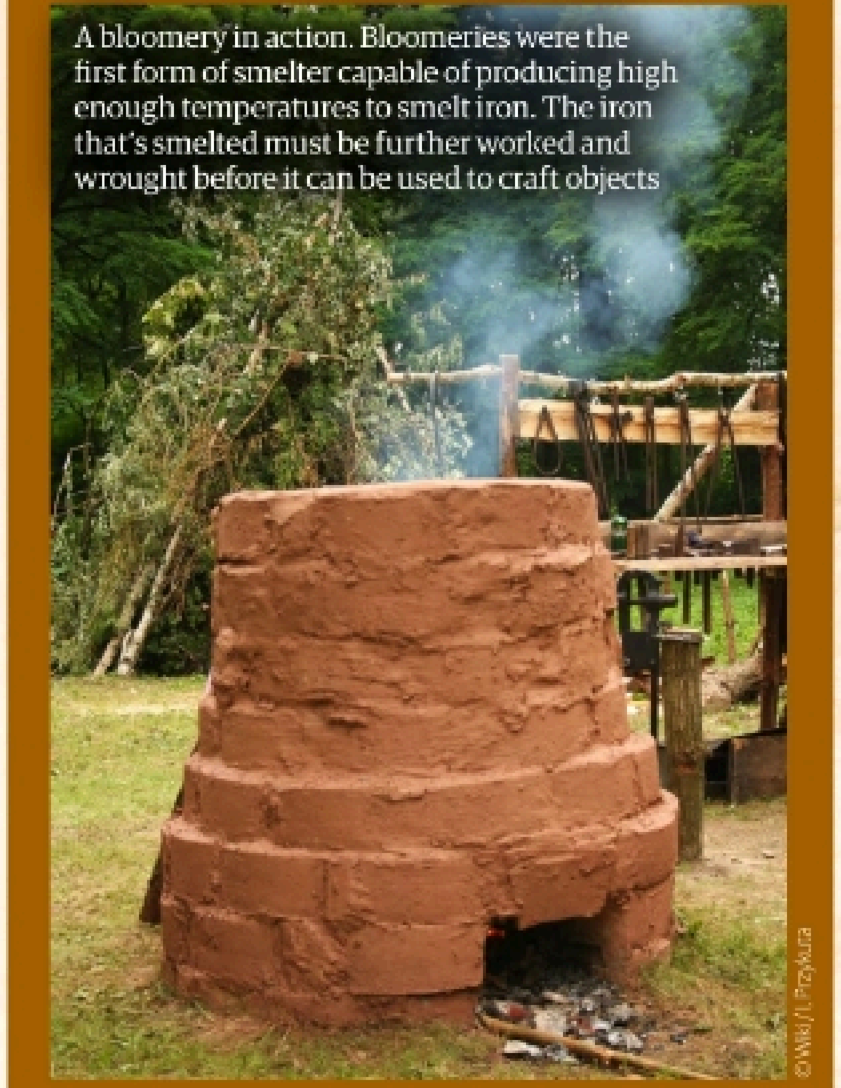
ABOVE RIGHT: This spiral-headed copper pin from Eastern Europe dates to 5000 BCE, making it one of the earliest known Copper Age artefacts. Small decorative objects like this could be cold-hammered from native copper rather than smelted from ore, and then cast or forged

warfare, creating a need for protection and more advanced weaponry. As the Copper Age became the Early Bronze, settlements began to be more heavily fortified; the Eurasian Sintashta culture invented chariots, whose use rapidly spread to the Middle East and Egypt, as did the copper that the Sintashta mined and traded intensively. Anthony's theory describes what can be archaeologically evidenced by the Seima-Turbino Phenomenon, which describes a pattern of stylistically similar artefacts and burial rituals from a relatively small time period during the Early Bronze Age (2100 BCE to 1900 BCE) that appear in sites thousands of miles apart across vast swathes of Europe and Asia. This, too, suggests the rapid mass-migration of a single cultural group, one that had significantly advanced metallurgical techniques compared to others of the era. Whether they were Sintashta or another group remains to be seen (the widespread Beaker culture is another potential candidate), but one thing is certain: these late Chalcolithic metalworkers were on the bleeding edge of the Bronze Age, and they took it, along with their language, culture and technology, with them wherever they went, to places as far apart as Mongolia, Finland, and Iran.

But were they the only people bringing copper (and later bronze) manufacture to the world? Absolutely not. We know that metalworking originated independently in the Americas, which at that point had no known contact with the Old World. Copper artefacts from sites in South and Central America, as well as the United States, can be dated to similar timeframes to those in Europe and Asia; the earliest known in South America are those from the Andean civilisations, but in North America they date even further back, to around 5000 BCE. However, North American copper artefacts from this period are a technological exception: they weren't smelted, cast or forged. Raw copper was abundant around the Great Lakes area, whose rocks had been scoured by glaciation during the last Ice Age, bringing the metal within much closer to the surface, and was obtained by creating cracks in the rocks using a combination of fire and water – essentially a primitive sort of fracking – and pounding with a hammerstone. The copper was then cold-hammered into the desired shape. Ancient South America, however, developed a full grasp of metallurgy, with evidence for smelted copper dating to 2000 BCE in the central Andes. Although no known Andean copper artefacts date back that far, results from an ice-core chemical analysis from the Illimani glacier, published in the scientific journal *Nature* in 2017, show that central Andean cultures were smelting enough copper at this time for the man-made pollution from their activity to be recorded in the ice of the nearby glacier.

Copper is, of course, an essential ingredient in the makeup of bronze, and the smelting cultures soon discovered that molten metals could be mixed into alloys. The first bronzes, found in the Middle East, are alloys of copper and arsenic, but the tough, toxic-fume-free bronze of the Bronze Age proper is made of copper and tin. These two metals are rarely found naturally together: only three lode sites worldwide carry deposits of both – one in Britain, one in Thailand, and one in Iran. The people of the Bronze Age would have to trade far afield to obtain the materials that made their civilisations possible. Perhaps it was the clever, highly mobile people of the Copper Age that gave them the idea to do so, along with many other technologies and ideas that would change the world radically and forever.

AFRICA: BYPASSING BRONZE



A bloomery in action. Bloomeries were the first form of smelter capable of producing high enough temperatures to smelt iron. The iron that's smelted must be further worked and wrought before it can be used to craft objects

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We think of the Bronze Age as a necessary step on the road to progress, but there are some areas and cultures that didn't bother with bronze and went straight from copper to iron. Studies suggest that the Nok culture of Nigeria in West Africa was producing iron from around 1000 BCE onwards. African ironwork utilised a particular kind of smelting technology known as blooming that was less popular in the rest of the Old World, which soon after the advent of the Iron Age (c 1200 BCE) began to adopt early blast furnace techniques.

The legacy of colonialism means that ancient African metallurgy is an under-studied subject – for decades, historians persistently clung to a belief that early metalworking techniques had been imported to Africa via either Egypt or Phoenician Carthage (Tunisia), and that iron had not been produced in the continent at all until the 19th century. Research into ancient African bloomeries still comes up against far more rigorous questioning than other archaeological smelting sites worldwide, with arguments raised about everything from the sources and storage methods of the charcoal that powered the bloomeries, to the physical context of the iron artefacts found, to problems inherent in accurate radiocarbon dating worldwide for the period 800 to 400 BCE. While we can now say for certain that African cultures were producing and using iron prior to the colonial period, what's still a source of debate is whether iron production arose independently in Africa, or whether it was imported from nations on the edge of the continent and the trade routes that had access to Eurasian trade and technology.

THE TRUNDHOLM SUN CHARIOT

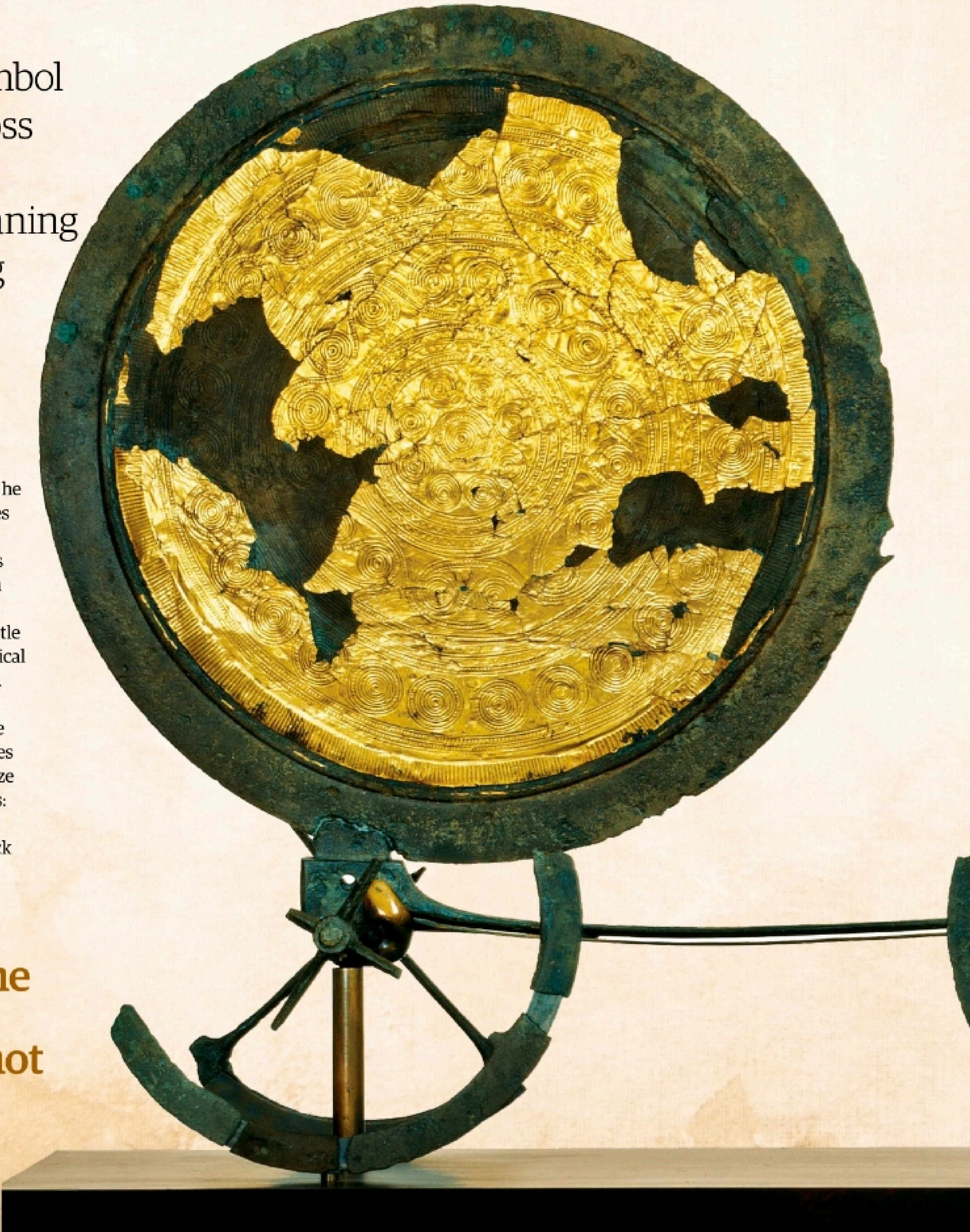
Whether an ancient calendar, or mythic symbol of the Sun moving across the sky each day, the mysterious hidden meaning behind this astonishing sculpture tantalises experts even today

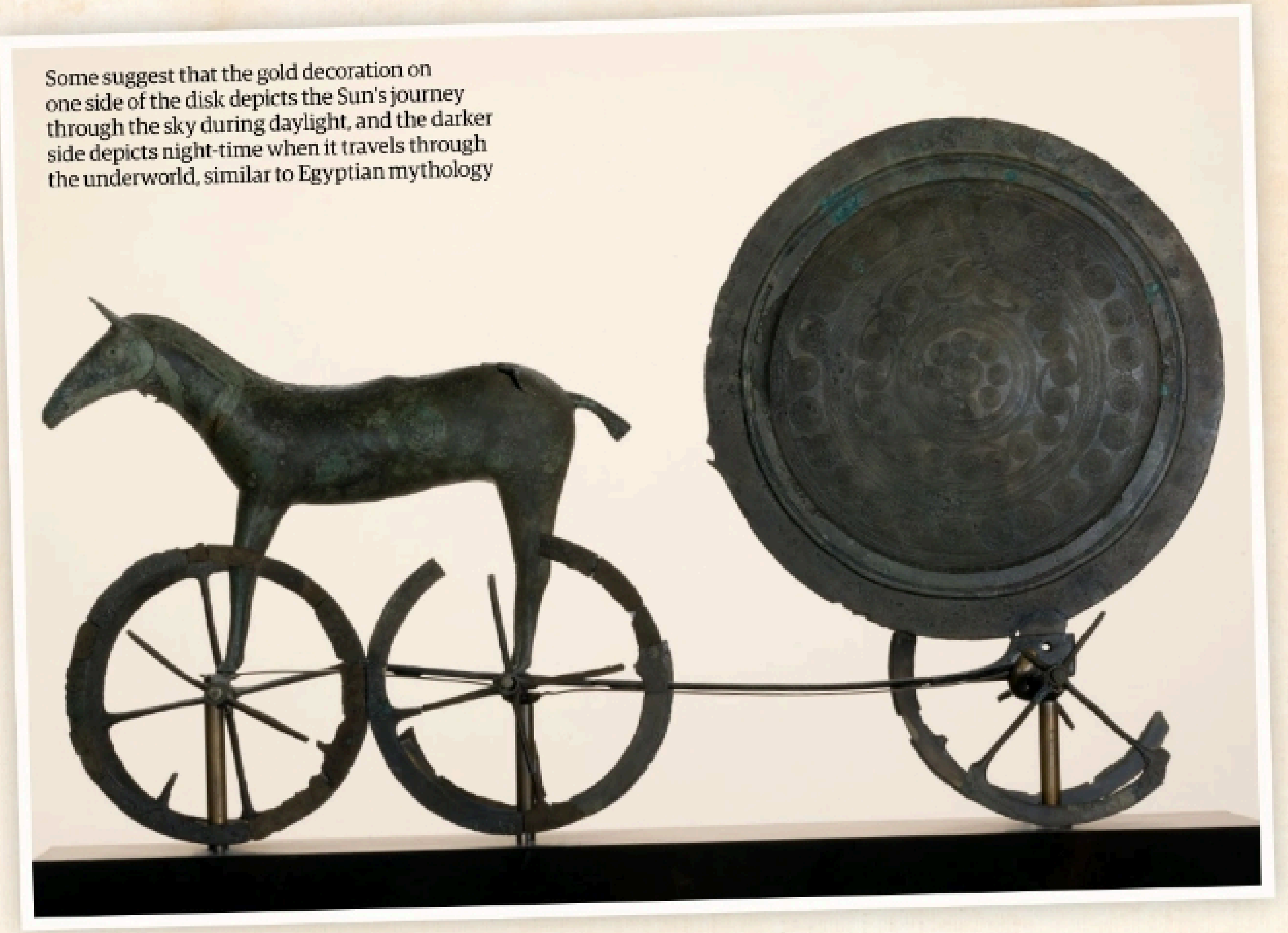
Written by **Dee Dee Chainey**

In the autumn of 1902, a Danish farmer ploughed his fields for the first time; what he found astounded archaeologists for decades to come. The Trundholm Sun Chariot, a sculpture from the Nordic Bronze Age, was unlike anything seen before. Strangely, the sun chariot did not appear with any other items to give clues to its use or meaning, but little by little archaeologists began to piece together its mystical function, and the symbolism that came with it.

While some experts still can't agree on an exact date since the discovery was made before pollen dating existed, the Nationalmuseet places its origin at around 1400 BCE, the Nordic Bronze Age. The piece is made up of a number of parts: a horse figure that sits on a rod attaching it to four spoked wheels, and connecting to two back wheels supporting a large bronze disk with a

"The question as to whether this was the only Sun chariot in existence has still not been answered"





Some suggest that the gold decoration on one side of the disk depicts the Sun's journey through the sky during daylight, and the darker side depicts night-time when it travels through the underworld, similar to Egyptian mythology

diameter of 25 centimetres. The statue was cast in bronze using the lost wax method, and then a thin sheet of gold applied to one side of the disk itself - setting it apart from the rest of the sculpture, which many believe represents the shining gold of the Sun. This disk is covered in mysterious symbols: zig-zags and concentric circles, and marks on the outer face that some say represent the rays of sunlight. While some suggest that the wheels symbolise the Sun on a chariot, others believe that the wheels are merely a functional addition to the statue, so that it can be pulled along as part of a ceremony. Many argue the chariot is not, in fact, a chariot at all, and is actually a mythic representation of the belief that the Sun itself is pulled across the sky each day. Experts believe that its creator was very familiar with astronomy, and some even suggest it might act as a type of calendar.

Various later myths from the region echo the symbolism depicted in the statue, including Skinfaxi, the horse tasked with leading Dagr's (meaning 'day') chariot through the sky in Norse mythology. Árvakr and Alsviðr were another two horses from Norse tales who led Sol's chariot, the goddess who was the personification of the Sun.

The question as to whether this was the only Sun chariot in existence has still not been answered, and parts of a Sun disk were also found at Jægersborg Hegn in the same region, which may well have been part of a further example.

The astonishing Trundholm Sun Chariot is now housed in Copenhagen at the National Museum of Denmark.

LEFT: From beneath the surface of the old Trundholm Mose boglands in northwestern Zealand, the glimmer of ancient treasure was seen for the first time in over three millennia

ABOVE: Solar barge and chariot imagery appears throughout many mythologies, including tales from Egyptian, classical, Chinese and Indian sources, showing the Sun being taken across the sky

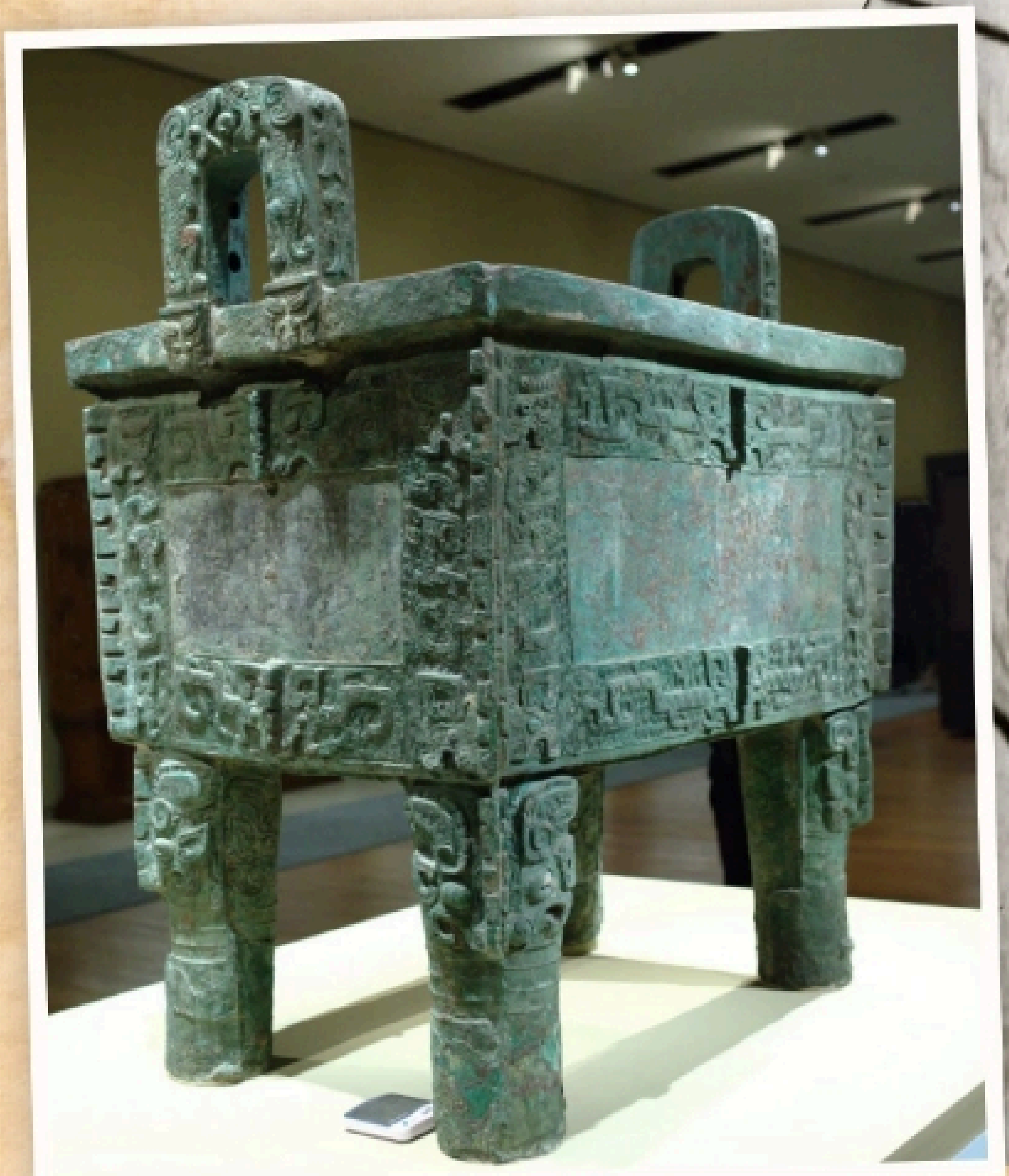
THE MYSTERIOUS HOUMUWU DING

Hailing from a land ruled by legendary kings, this ritual vessel is the heaviest piece of bronze surviving from the ancient world

Written by Dee Dee Chainey

The first archaeological evidence of an established dynasty stems from the Chinese Bronze Age , when the Shang Dynasty settled on the banks of the Yellow River. Throughout the second millennium BCE, Henan Province rose to become an unrivalled power and a centre of bronze-working. With this metallurgical wealth came the political and military power of a culture that controls resources and the landscape that they live within. While the Shang Dynasty was overthrown by the Zhou Dynasty, the material culture of these two powerhouses came to epitomise the Chinese

RIGHT: Dings were considered important items, and a person's rank dictated how many each individual was allowed to own



BELOW: Previously known as Simuwu Ding, it stands on four legs, and measures 133cm long, is around 111cm wide, and weighs almost 900kg

> **“A hollow sacrificial vessel, thought to be used for storing or cooking food. However, dings are not just utilitarian items”**

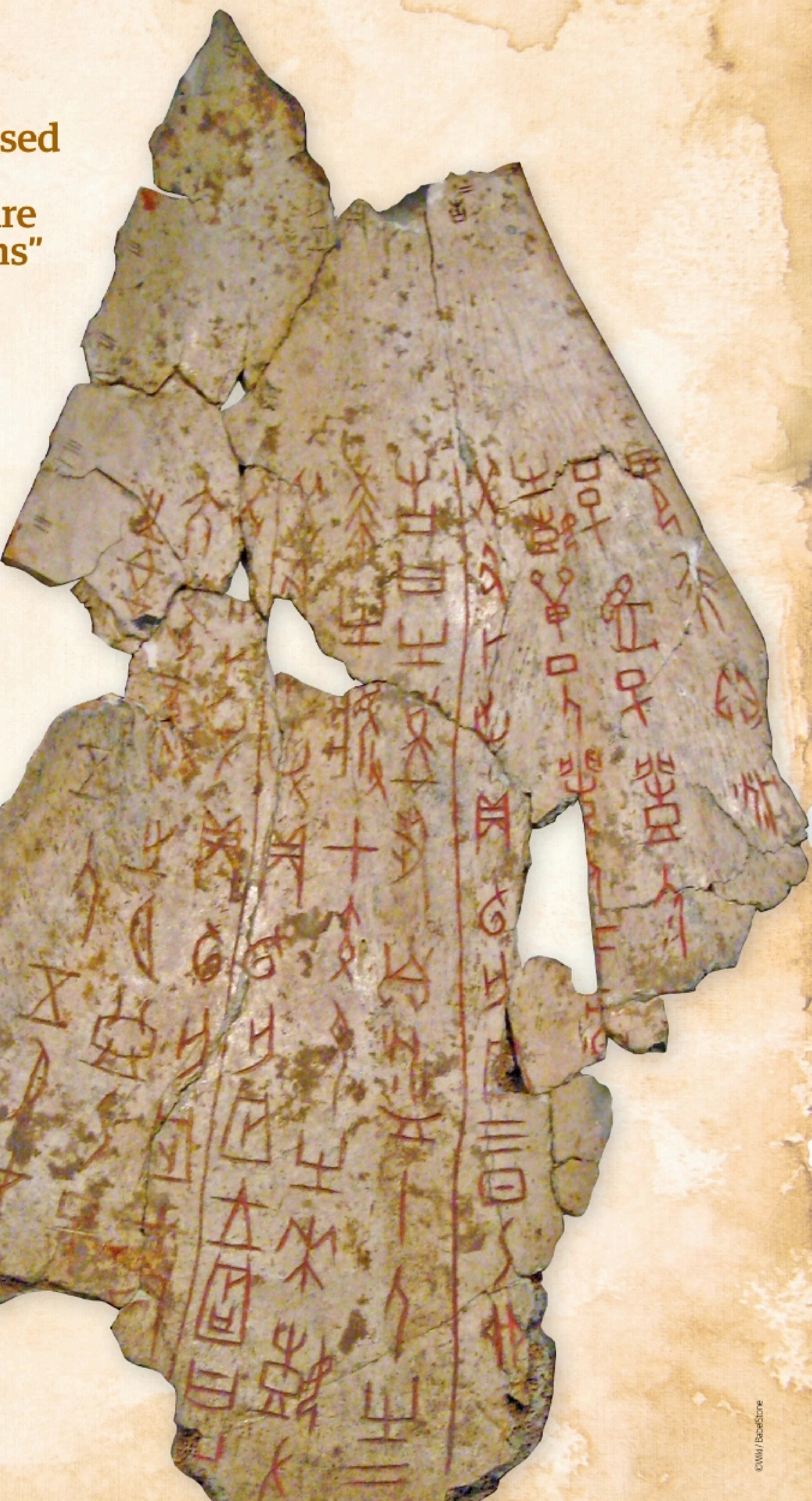
Bronze Age. And it is from this region that we now have the largest piece of bronze that now exists in the world.

Originating from the Shang Dynasty, the Houmuwu Ding was found at Anyang, a city in Henan that stories tell was near the capital cities founded by the two legendary sage-kings, Zhuanxu and Emperor Ku, centuries ago. The ding is a hollow sacrificial vessel, thought to be used for storing or cooking food. However, dings are not just utilitarian items: they could also be used for housing ritual objects and offerings, and were associated with complex rituals, for instance sacrificing food to the ancestors.

The ding bears the inscription, “Queen Mother Wu”, whose real name was Fu Jing. She was one of 60 wives of the great Shang Dynasty king Wu Ding; yet she was also one of just three that he made queen. Fu Jing was an impressive figure, known to take part in military expeditions, as well as conducting ritual divination to predict important state matters, often relating to farming business. While the ding was unearthed in 1939, the queen’s temple was not found until 20 years later – thoroughly ransacked.

Bronze items in China were mould-casted, allowing for the possibility of intricate decoration including geometric designs, and cloud and thunder patterns – dings were no exception. Taotie were common motifs used to decorate dings. Known as one of the four evil animals in Chinese mythology, they take the form of animal heads, depicted as stylised symmetrical designs with eyes, but no mandible. The Houmuwu Ding has decorative bands on each of its four sides featuring taotie, alongside one-legged dragons. It is carried by two handles, each featuring two tigers, both savaging a human head.

In 2003 the government passed a law, forbidding the Houmuwu Ding – along with a number of other important cultural relics – from being taken out of the country to be exhibited abroad.



RIGHT: King Wu Ding is the earliest individual from the Chinese dynasties whose existence has been confirmed, namely through inscriptions on oracle bones found at his capital city near the Henan Province city of Anyang

©Wiki / BabelStone

HOW BRONZE BEGAN

The coming of bronze was a turning point in history wherever it appeared, and nothing would ever be the same again

Written by Ben Gazur

The Copper Age saw the first smelting and casting of metal tools. The bright gleam of copper and its ability to be shaped at need would have made it one of the wonders of the age. Yet for all its brilliance there is a flaw in copper – it flashes prettily but bends and deforms easily. You would have a hard time hammering a copper nail into wood. Something harder was needed if metal was to become truly useful. With smelting already invented, all that was needed was for people to learn to mix different kinds of metals together to make alloys. The Bronze Age was to be the age of the alloy.

INVENTING BRONZE

It can seem counter-intuitive, but alloying two metals together that are both soft can create a material that's much harder than either individually. To understand why you have to work out exactly what is happening within a metal.

Metallic elements in their solid form have a crystalline structure. The atoms arrange themselves into set patterns that repeat throughout the material. The atoms form layers surrounded by a soup of electrons. In a pure metal these layers will be regular and often form quite a malleable material, as atoms can easily be moved around within the structure with layers slipping past their neighbours without much force.

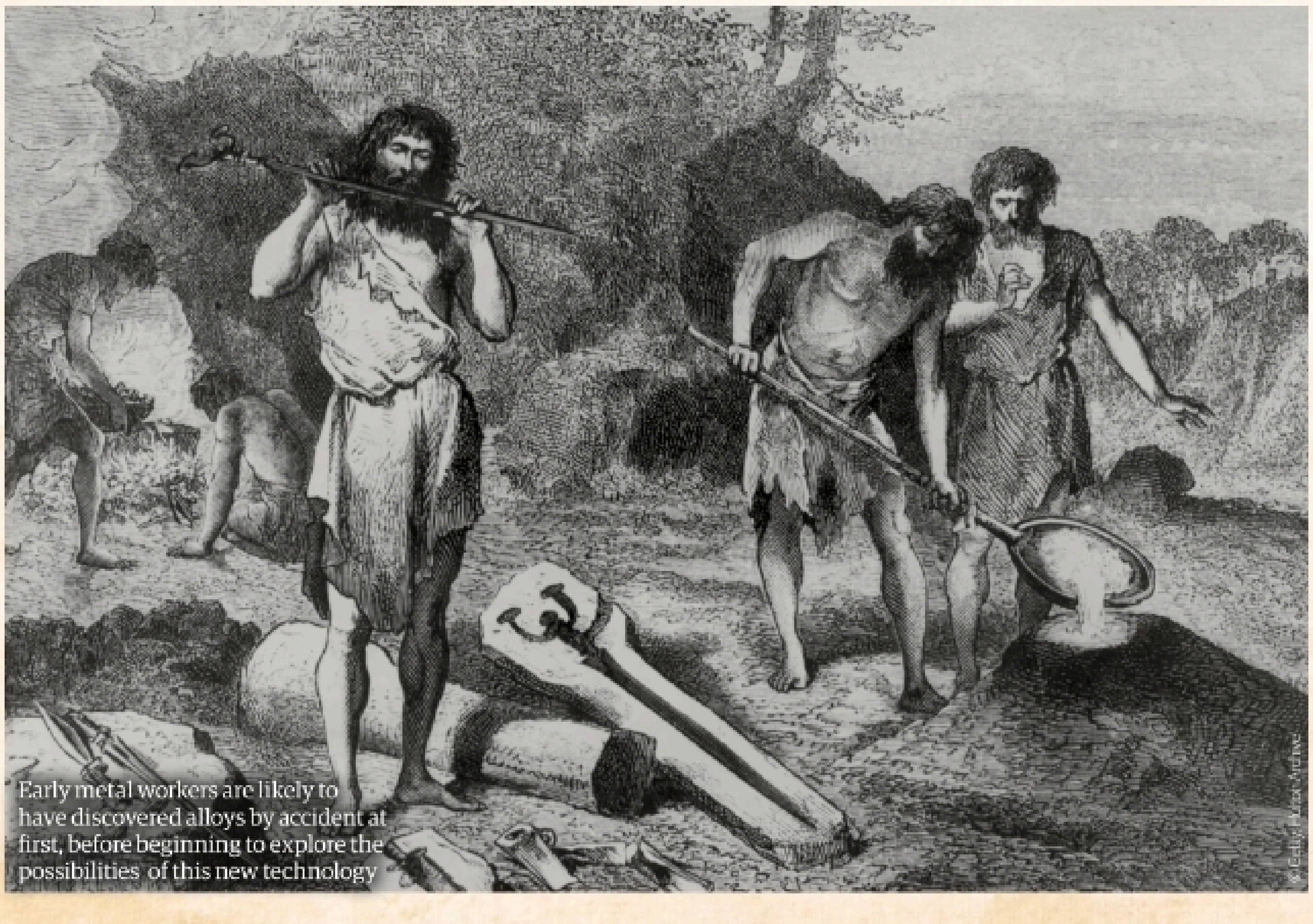
When an alloy is made, however, a new element is introduced to the mix. The new element's atoms have different properties and sizes to the original metal's atoms and so do not fit regularly into the crystal structure. It is like mixing baseballs and footballs together. Disorder is introduced to the material and this can bring a number of benefits. Without neat layers more force is required to push layers past each other, making for a tougher material. The new structure of the alloy may also have a lower melting point than the pure metal, making casting and reforging it more simple.

There is still controversy about where the first bronze items were made. Dating metals can be difficult even when found in a sound archaeological context. Current thought is that bronze technology emerged in many locations at different times once the ability to smelt copper was in place. It does seem likely though that the first alloys were entirely accidental.

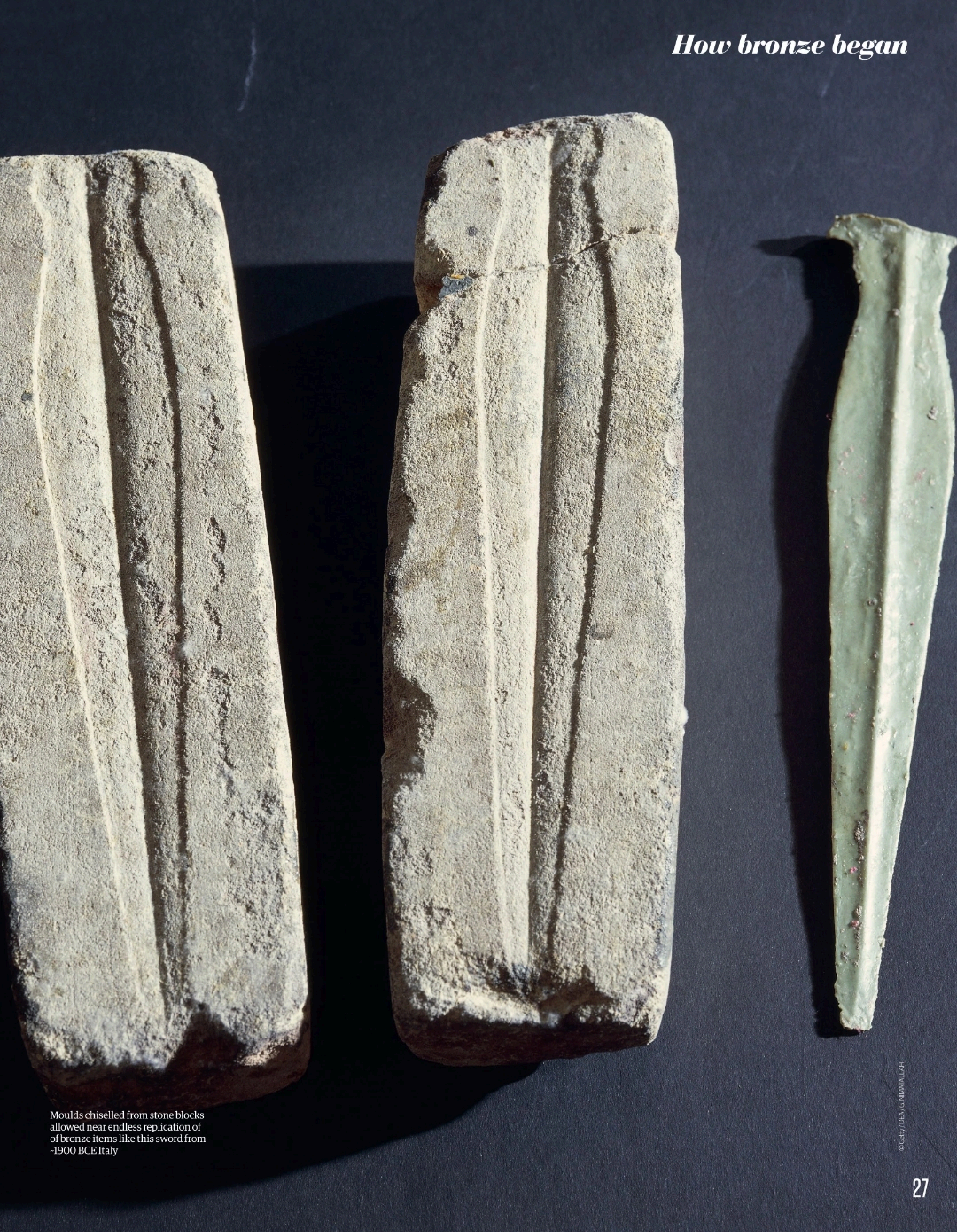
In many places copper and arsenic are found together. Egyptian copper ores can have significant amounts of arsenic in them and so when the copper from those ores was smelted, an unintentional alloy was created called arsenic bronze. This alloy produced more durable tools and when molten it flowed into moulds more readily. At some point it must have been recognised that objects cast from these sources were more useful because increasing levels of arsenic, far beyond what is possible by accidental contamination, were later added to copper. Workers in arsenic bronze had a sophisticated knowledge of their craft. If arsenic bronze is created with more then 2% arsenic then the resulting metal is brittle and easily splintered. Objects from many places and times show that the amount of arsenic was very finely controlled around this level – quite the achievement for people with no knowledge of what an element was. It may be that the garlic-smell of arsenic compounds when heated and beaten with a hammer guided bronze makers in their work.

When arsenic bronze is work-hardened, beaten with a hammer, it forms a structure that is much more able to hold a cutting edge. Arsenic bronze

"Alloying two metals together that are both soft can create a material that's much harder than either individually"



Early metal workers are likely to have discovered alloys by accident at first, before beginning to explore the possibilities of this new technology



Moulds chiselled from stone blocks allowed near endless replication of of bronze items like this sword from ~1900 BCE Italy

© Getty / DEA / G. NIMATALLAH

The ability of bronze to hold a sharp edge gave it a place in the tools of many crafts, such as this adze from Ban Chiang

remained in use in Egypt from the pre-dynastic era of ~5000 BCE to the Middle Kingdom of ~2000 BCE.

While the ancient metallurgists would have been entirely unaware of the chemistry they were performing, there are other benefits to using arsenic when smelting copper. If oxygen is present when copper is smelted it can lead to the creation of copper oxide, which would reduce the strength of objects made with it. Arsenic reacts with oxygen and creates arsenic oxides that vaporise and leave the metal free from oxygen contamination. As we shall see this vapour had other, unintended, consequences.

Another reason that arsenic may have been added to copper during smelting is one of aesthetics. Increasing the amount of arsenic in the alloy changes the final appearance of the polished bronze. The more arsenic, the more silvery the final result appears. In the Caucasus, bronze daggers have been found with arsenic-rich external layers that may have been used simply to change the appearance of the metal. Despite tin being a far more rare material and difficult to locate and transport around 3000 BCE, in many places in the Middle East tin became the preferred element to add to copper to create bronze. Why would a common ingredient be replaced with a rare and expensive one? There are material advantages to tin bronze but the dangers of working with arsenic have to be acknowledged.

In the ancient pantheons of several religions there was a specialised god of many crafts, and smithing was no exception. For the Greeks, Hephaestus was the god metal workers prayed to, while to the Romans he was Vulcan. In both cultures he is called 'lame' and is depicted as limping about. Other smithy gods such as Wieland, Volander, and Ilmarinen are also shown as disabled in some form or other. While mythology offers an explanation for his disability, it has been suggested that the smith god's problems actually arose from the memory of metal workers lamed by exposure to arsenic in their work.

Chronic arsenic poisoning could occur if workers breathed in the arsenic-laden vapours that smelting produced. Damage to the peripheral nerves is common in those poisoned in this way, and a limp or dragging foot sometimes develops. For those with the most exposure to arsenic, terrifying symptoms like vomiting, convulsions, and death could have been the result of their pursuit of useful tools. The coming of tin to the world of bronze manufacture may have been sped by the desire not kill those most skilled in the art of making bronze.

> "It has been suggested that the smith god's problems arose from the memory of metal workers lamed by exposure to arsenic"

As well as being less toxic than arsenic, tin has other advantages. When six to ten per cent tin is added to copper you get a bronze that is strong, resistant to salt water corrosion, and holds a sharp edge. Different areas used differing ratios of tin to copper, however, with Chinese bronze swords often having up to 20 per cent tin which gave them remarkably sharp edges but left the whole blade brittle. The differing qualities of bronze that could be produced depending on the amount of tin that was added would later be exploited. Mild bronze, made with 6 per cent tin, could be beaten into sheets and was used for helmets and armour. Classic bronze of 10 per cent tin was used in swords and tools.

Tin bronzes are as strong as arsenic bronzes and the molten metal flows into moulds smoothly to fill all available space. The real advantage is that working with tin allows for identical batches of bronze to be made each time. The danger of arsenic is in the vapours it produces. Since arsenic can be driven off in different amounts depending on a range of conditions from temperature to availability of oxygen, you can never be totally certain of how much arsenic will remain in the finished alloy. Tin does not vaporise readily. Arsenic-rich ores can also have varying amounts of arsenic in them, but metallic tin is pure tin, so definite amounts of tin can be added each time.

Now you have your ingredients and your recipe for bronze, it is time to make some.

MAKING BRONZE

Mining and smelting copper had given Bronze Age peoples a good handle on the technology required for producing bronze. Tin melts at a temperature of 232°C, far below the melting point of copper, which is 1085°C. Once copper has been melted in a furnace, adding the necessary amount of tin to the liquid copper will automatically produce molten bronze. This could then be poured out into ingots or used immediately to cast other objects. Getting tin may have been difficult in the Bronze Age but making use of it was easy.

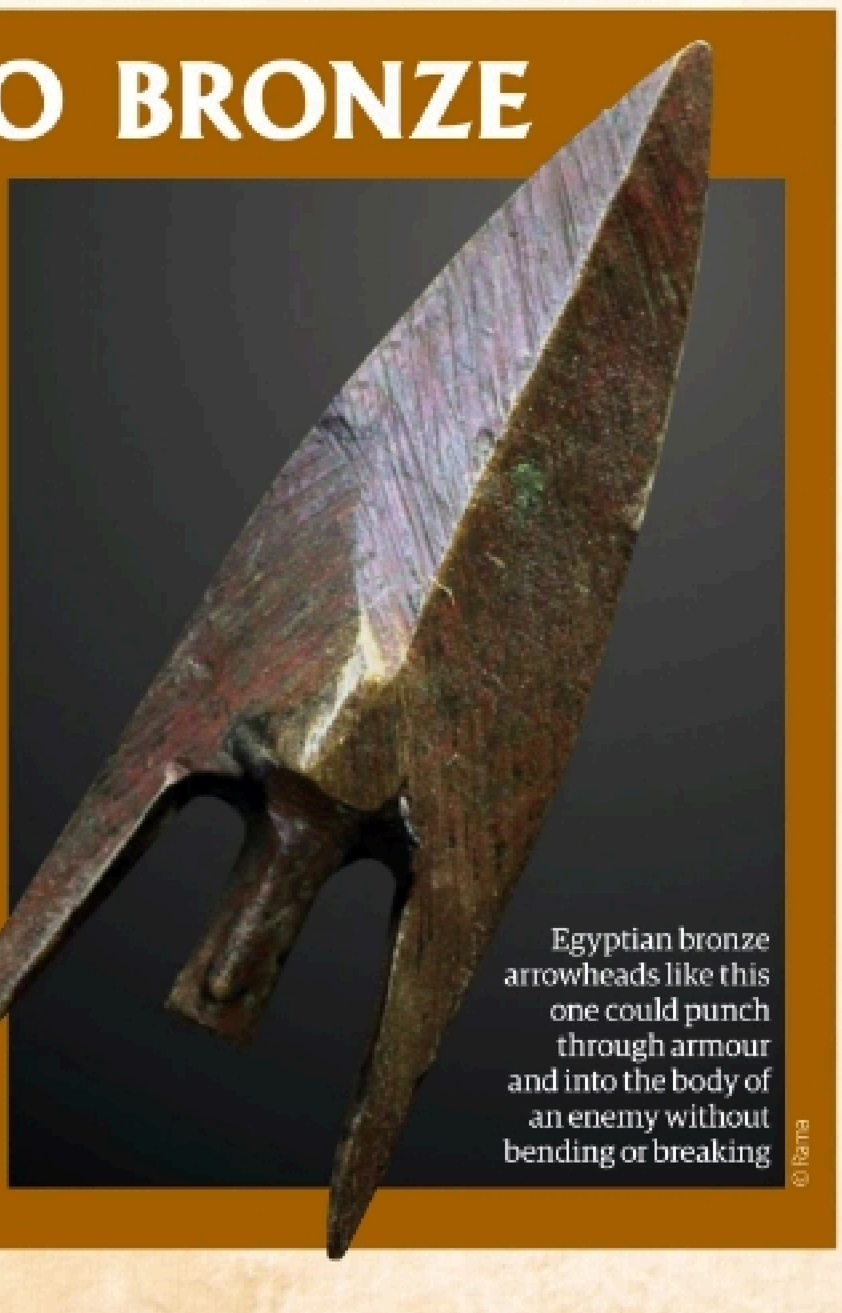
One of bronze's key abilities is that it can be easily melted down and recast for use again. If a sword breaks or armour is broken then it can be returned to the furnace to be recycled. Because bronze becomes a liquid at 950°C, below the melting point of copper, no special heating technology was required to reuse bronze. A smith with a pair of bellows would soon have bronze reduced to its liquid form in a furnace.

To cast bronze several techniques were used. Perhaps the most simple was that of sand casting. By creating a wooden frame and filling it with

FROM STONE TO BRONZE

Arrows were one of the most powerful weapons in the ancient arsenal. Light, easy to use, and able to strike at a distance, they gave hunters and soldiers a huge advantage over their prey, be it human or animal. In the Stone Age the arrowheads of choice were often made from knapped stone.

By striking certain stones like flint at an angle it is possible to create an incredibly fine edge that can cut through flesh with ease. Many different shapes could be made that altered the behaviour of the arrow in flight and when it struck its target. Throughout the Stone Age, and well into the Bronze Age, these arrowheads were the favoured way to tip arrows. Bronze, however, slowly pushed stone aside. Stone arrowheads can be fearsomely sharp yet the brittle material they are made from would shatter against bronze armour. To defeat an armoured enemy therefore, bronze arrowheads were needed. While it may have taken a skilled knapper a long time to craft a single arrowhead, many bronze ones could be turned out of moulds quickly. In the brutal world of bronze, stone simply could not cut it any longer.



Egyptian bronze arrowheads like this one could punch through armour and into the body of an enemy without bending or breaking

© Rama

sand you can create a mould by impressing whatever object you wish to make into it. You could make a model of an axe out of clay, for example, and push it into the sand. Then a second frame could be placed on top and also filled with sand. By compacting the sand as closely as possible the frame can then be opened, creating a hollow the exact same shape as the desired object. By carefully removing sand to create a channel for the molten bronze to enter, you have now got everything you need to cast a metal object. Given the ephemeral nature of the tools used, however, there is little evidence of sand casting in the archaeological record.

Stone moulds were commonly used in many locations and have survived. From Bronze Age Italy stone moulds have been found for the manufacture of axes, daggers, sickles, and ornaments. The process of making a stone mould involved breaking fine-grained stones in two with a bronze chisel and carefully excavating the shape of the final object. This was a skilled technique and would have required a great deal of practice and patience to create moulds, but once they were made a stone mould could be used over and over again to cast hundreds or thousands of identical bronze products.

Unlike a stone mould, a clay one can be used only once to create a bronze object. Using a clay mould could be a simple act, such as covering a blade to create a mould for a sword, or it could be highly complex. In the late Bronze Age the 'lost wax' technique was used, where a model would be made of wax and surrounded in clay. As the clay was fired in a kiln to harden it the wax would burn away to leave a hollow mould.

In China bronze containers called ding were made from clay moulds that involved many complicated steps. First a model of the container, including its decoration, would be made from clay. Once this had hardened then wet clay would be pressed onto it to create a negative impression. These negatives would be allowed to dry until they could be cut off. The original clay model was then shaved down by the desired thickness of the final casting. By reassembling the negative clay panels around the now smaller original, a highly decorated chest could be cast. The Houmuwu Ding, dating from around 1000 BCE, weighs 830 kilograms and is the largest bronze item surviving from antiquity.

Bronze's unique advantages over the copper it replaced were its durability, strength, and ability to hold a sharp edge. To make a blade as sharp as possible from bronze, however, requires it to be work-hardened. By beating the edges of a blade, imperfections from the casting process can be removed, but it also makes changes at the atomic level. Beating creates smaller grains within the metal and, much like alloying itself, this creates less chance of planes of atoms within the metal sliding past each other.

The final step in creating bronze objects is polishing them. A polished bronze, depending on

Molten bronze flows to fill the shape of whatever mould it is poured into which allows for easy manufacture of complex items

© W.N. Tallek

Introducing new elements to a metal may disrupt its atomic structure and produce a material with radically different properties

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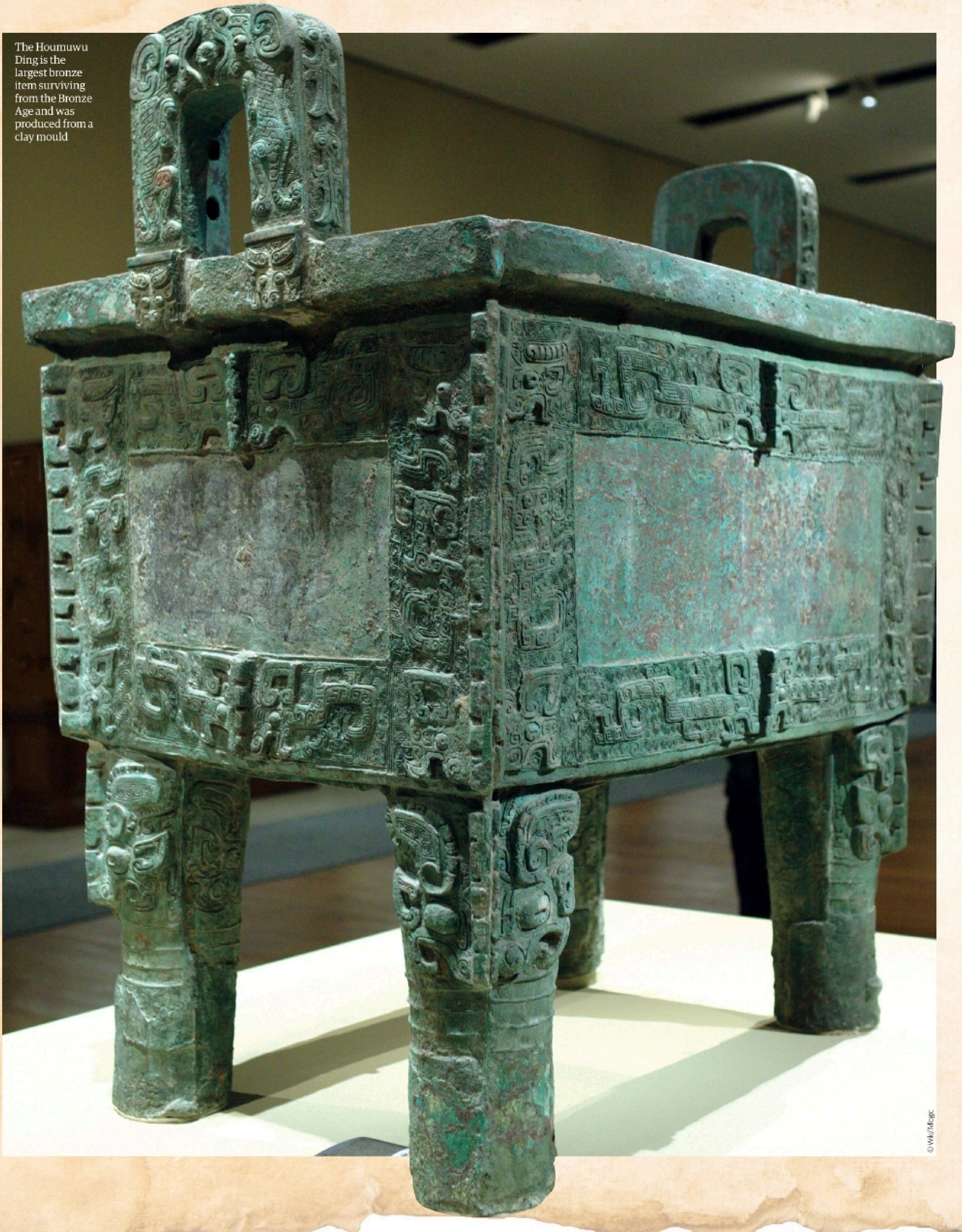


The Houmuwu Ding is the largest bronze item surviving from the Bronze Age and was produced from a clay mould

© Wiki/Mlogic

the alloy used to make it, can appear as either gold or silver – though of course much stronger than either of those two glittering metals. The shine of bronze would have made it one of the most high-status materials available at the time.

USING BRONZE

It is hard to be certain what the first use of bronze was. While dating metals can be problematic there is also the fact that bronze was a highly valuable substance in the ancient world. Only the most exalted people were likely to be buried with metal objects. Bronze, which can be reworked almost infinitely, was probably recycled rather than wasted. Among the earliest bronze artefacts discovered are weapons like spearheads, arrowheads, and daggers. There are also a great many examples of bronze being used for art, jewellery and decoration.

Polished bronze glows by daylight and shimmers in the light of the wavering flames of lamps. Bracelets and other items of jewellery made from bronze have been discovered across the world from Bronze Age sites. A bronze statue known as 'The Dancing Girl' from the Harappan civilisation of the Indus Valley around 2600-1900 BCE shows a female figure decked out with 29 bangles, 25 of them on her left arm. The beauty of bronze should not be forgotten among its more mundane or murderous uses.

It was in weaponry that bronze had its most profound effect. Bronze's ability to hold an edge opened new frontiers in warfare. Stone weapons, maces, and knapped arrowheads had dominated weaponry before the invention of bronze. Pure copper is too soft to be of much use in a battle where it would soon be dulled or bent. Bronze however could withstand multiple strikes and still be a deadly threat.

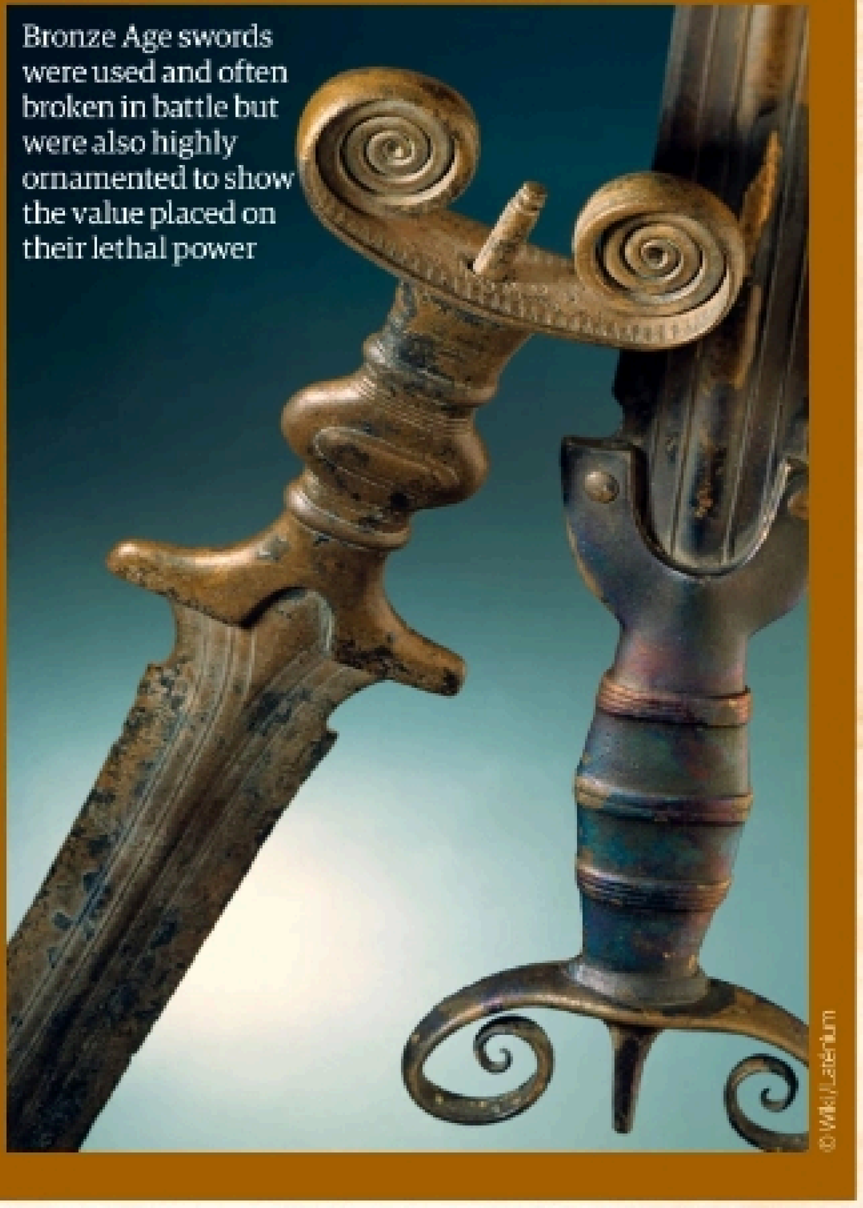
Daggers of copper and bronze are found in Egypt from around 3100 BCE but appear to have been mostly ceremonial and were often highly adorned. While short daggers would have been practical weapons for very close fighting in a large, massed battle, they must have been the choice of last resort. Spears, arrows, and axes were the predominant force on the battlefield. Daggers would only come into their own when they were slowly lengthened into the blades that we call swords.

SWORDS OF THE BRONZE AGE

As soon as swords developed they began evolving into differing forms as people sought ever more efficient ways of cutting down their foes. The first swords were used much like daggers, with sharp points most suited for stabbing into enemies. With a weak spot at which the blade connected to the handle, slashing with them risked a sword breaking apart in the hand.

Swords with wider blades that were better able to survive battle, known as leaf-shaped blades, developed. With sharpened edges on both sides of the swords a warrior could hack at soldiers in any direction. A composite sword type known as the carp-tongue featured a triangular blade that could be used both for stabbing and slashing.

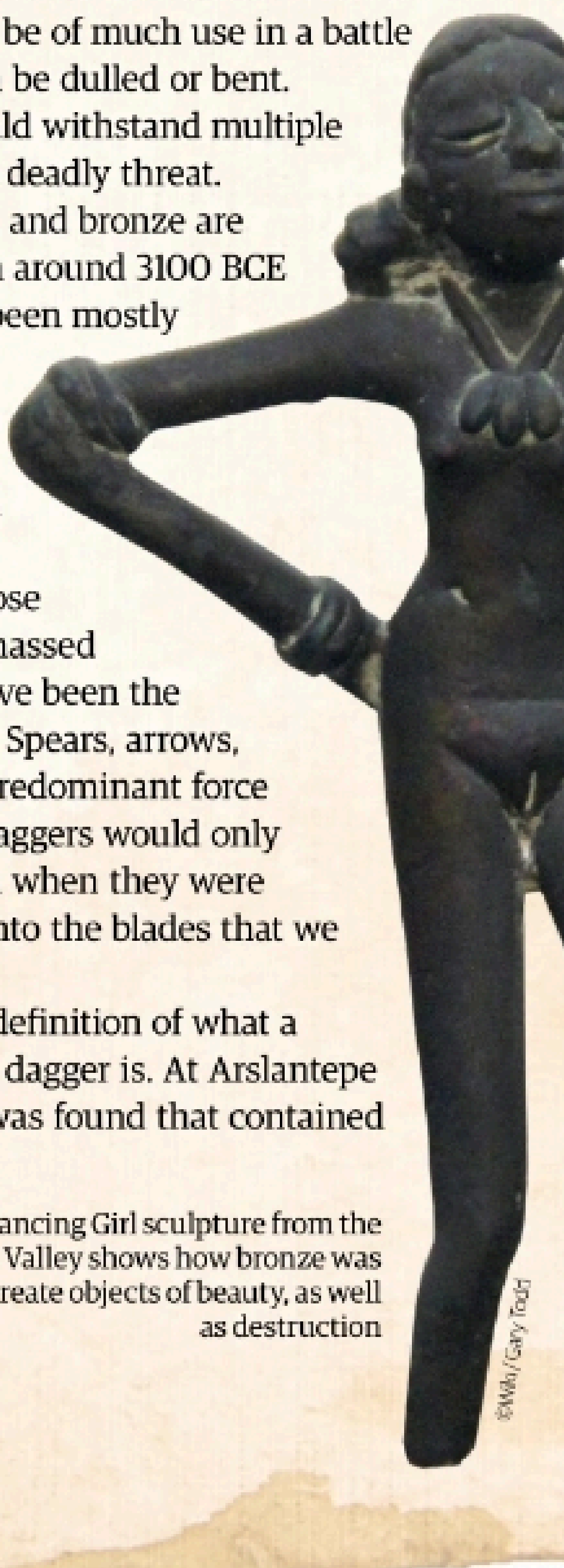
In Mesopotamia the curved sickle sword called the khopesh was favoured. Only the outer edge of its hooked shape was sharpened to a cutting edge. A thicker inner edge gave the blade strength while the tip could still be used to drive into an enemy. With the curve a soldier could hook and pull away at a shield to strike their opponent. The khopesh became the sword of choice in a number of Middle Eastern cultures before being abandoned at the end of the Bronze Age.



Bronze Age swords were used and often broken in battle but were also highly ornamented to show the value placed on their lethal power

© Wiki/Lateinium

> "Among the earliest artefacts discovered are weapons like spearheads, arrowheads, and daggers. There are also examples of bronze being used for decoration"



The Dancing Girl sculpture from the Indus Valley shows how bronze was used to create objects of beauty, as well as destruction

©Wiki/Gary Todd

There is no clear definition of what a sword is and what a dagger is. At Arslantepe in Anatolia a tomb was found that contained either long arsenic bronze daggers or short swords from around 3000 BCE. All were cast in a mould and several bear intricate silver decoration. It was only around 1800 BCE however that the first swords truly developed elsewhere in the Mediterranean. Almost immediately thereafter swords are found across the Middle East and high in northern Europe. In a find from 1600 BCE in Nebra, Germany, two bronze swords were recovered, showing how quickly knowledge of sword creation had spread.

The earliest bronze swords had no tang, a piece of metal protruding from the bottom of the blade, and so had to have their handles riveted on. This introduced a weak point on the sword which must have left many warriors in battle holding just a handle after the blade had been sheared off on impact. Many early bronze swords have been found that show rivets having been torn out. Later swords kept the rivets even after a tang had been added to the blade which removed the chance of the sword flying off.

Of course bronze was not only used in warfare and for decoration. It would always have been a costly material, but it did find a place in the farm and the home. Bronze axes could cut down trees as easily as they could men on the battlefield. Ploughs with stone blades did a fine job but if they struck another stone in the field then they often shattered. With a bronze plough the damage, if any, could be repaired quickly. When harvest came a bronze sickle could make light work of reaping grain.

Bronze could make a huge difference in even small villages. In Ban Chiang in Thailand many bronze artefacts have been discovered from ~1900 BCE that reveal a whole array of bronze uses that did not rely on warfare as motivation. Ban Chiang was not part of a large bellicose society and yet they still imported and worked with bronze to produce tools like adzes for shaping wood, kitchen utensils, and decorative bangles and bells.

The Bronze Age may have changed the world through trade and on the battlefield, but for most of the people alive at the time it was the subtler, quality-of-life improvements in their lives that were brought about by bronze that would have most impressed them.

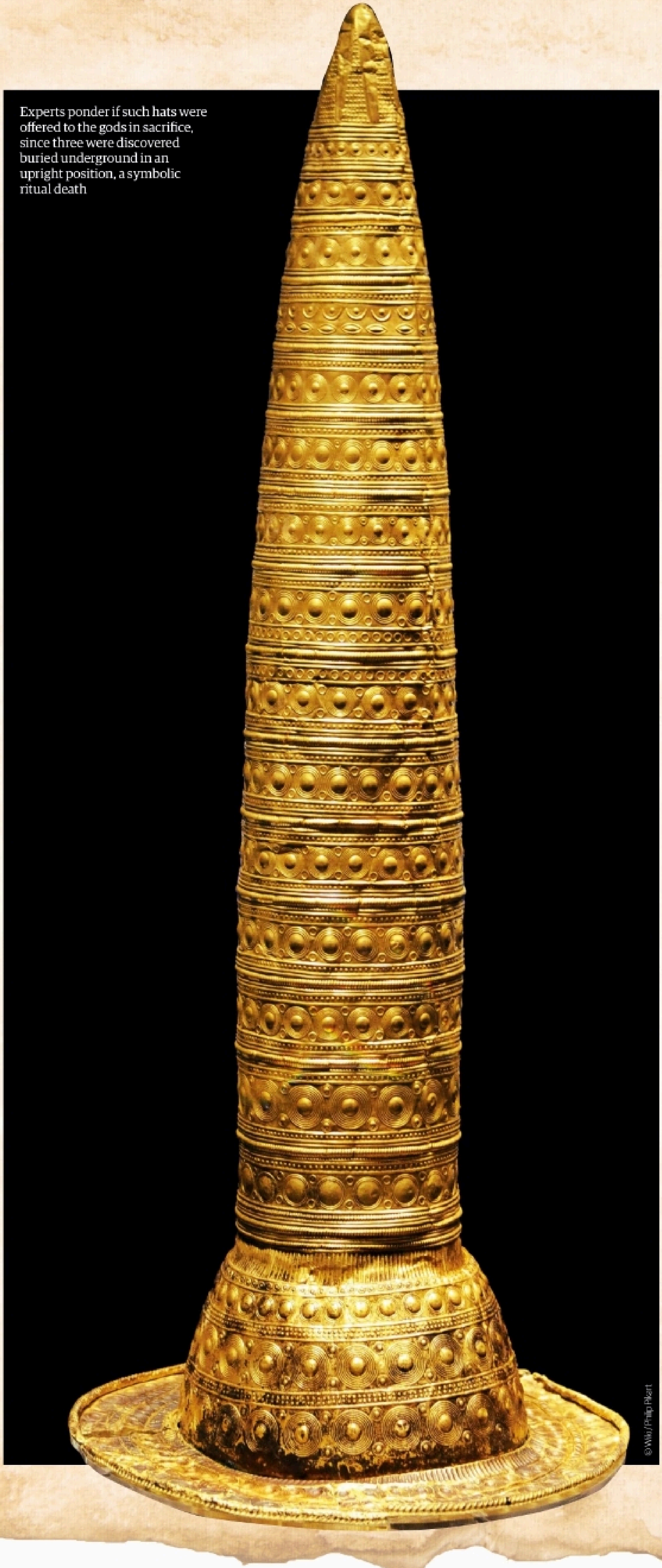
THE BERLIN GOLD HAT

Once thought to be ancient fertility symbols, are such ceremonial hats tokens of a prehistoric Sun deity, or even ancient calendars?

Written by Dee Dee Chainey

The Bronze Age was the time of the first metals, when the alchemy of turning rock into shining gold was a new form of magical science. The Berlin Gold Hat encapsulates this magic more than any other item from this era for many, as it conjures images of ancient priests processing through timeless landscapes, clad in the iconic gold of ancient times.

After more than 3000 years, this strange conical gold hat is still in pristine condition, emanating the magic of the prehistoric world into which it was born. Believed to be a ceremonial headdress, this is one of only four conical gold hats in existence, known as the 'Schifferstadt type'. It is the only surviving example that still has its whole rim intact. Nobody knows where this hat was discovered, but it was recovered from art dealers by the Berlin Museum of Pre- and Proto-History in 1996, reportedly coming from a private collection in Switzerland or Swabia, with speculation blaming illicit trade or grave robbing for its shrouded beginnings. Two of the others were found in Nuremberg and Speyer in Germany, and a further example in Poitiers, France. The hat is miraculously hammered out from one single sheet of gold alloy. It towers a wondrous 74.5cm, yet is so thin it weighs under 500g – less than a loaf of bread. It's thought that the gold was the



Experts ponder if such hats were offered to the gods in sacrifice, since three were discovered buried underground in an upright position, a symbolic ritual death

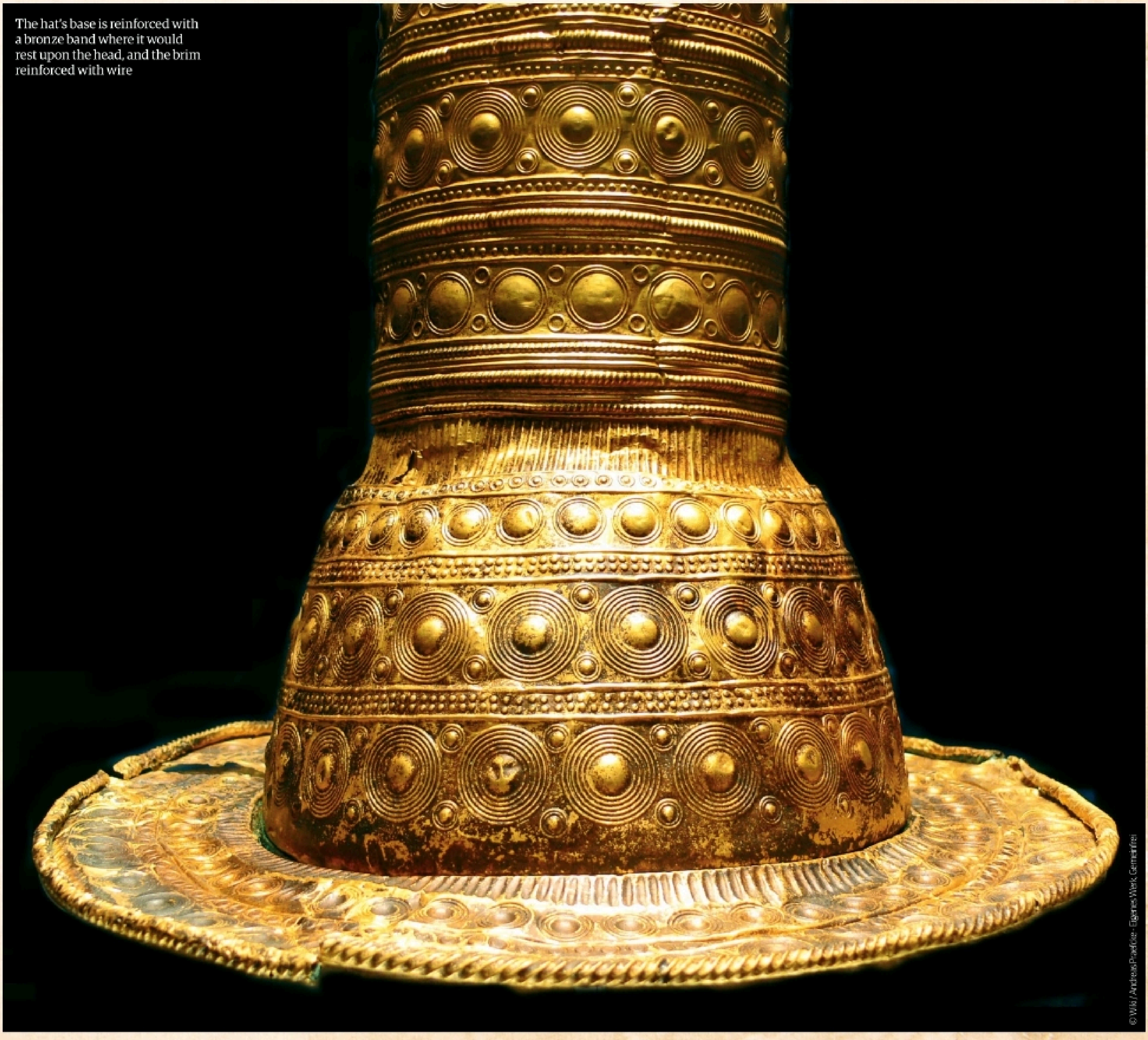
© Wiki / Philipp Pikart

external covering of an inner hat, made from an organic material like leather or fabric, possibly with a chin strap.

Many think that such hats would have been worn by priests during ceremonies, and may have symbolised dominion over nature, due to the incredibly advanced astronomical knowledge depicted in their etchings, with some experts calling them 'Lords of Time'. The decoration is similar to the style found in the late Bronze Age, embossed using wheels and stamps, leading experts to date the hat to around 1000 – 800 BCE. The series of circles, crescent and buckle motifs that appear in 21 zoned areas on the Berlin Hat convey a deep knowledge of calendars of both the Sun and Moon, allowing observers to understand their phases and even predict lunar eclipses, aiding with the planting and harvesting of crops. Such hats lead experts to wonder about the existence of a Sun cult in Central Europe during the Bronze Age, and if they might be the symbol of a solar deity.

The piece now sits, resplendent, in the Neues Museum on Museum Island in the midst of the vaulted 'Star Room', no less magical than it was when it was first made. While such an exquisite ritual item might seem totally alien to 21st century life, it uncovers a commonality that transcends time: a wonder at the Sun and stars that humankind has shared for millennia, an awe of the night-sky that we still have even today.

> "Such hats lead experts to wonder about the existence of a Bronze Age Sun cult in Central Europe, and if they might be the symbol of a solar deity"



The hat's base is reinforced with a bronze band where it would rest upon the head, and the brim reinforced with wire

© Wiki / Andreas Praefcke - Eigenes Werk, Gemeinfrei

THE BUSH BARROW BURIAL

Britain's richest Bronze Age burial is said to be the grave of the 'King of Stonehenge', and accompanied by treasures likened to the Crown Jewels

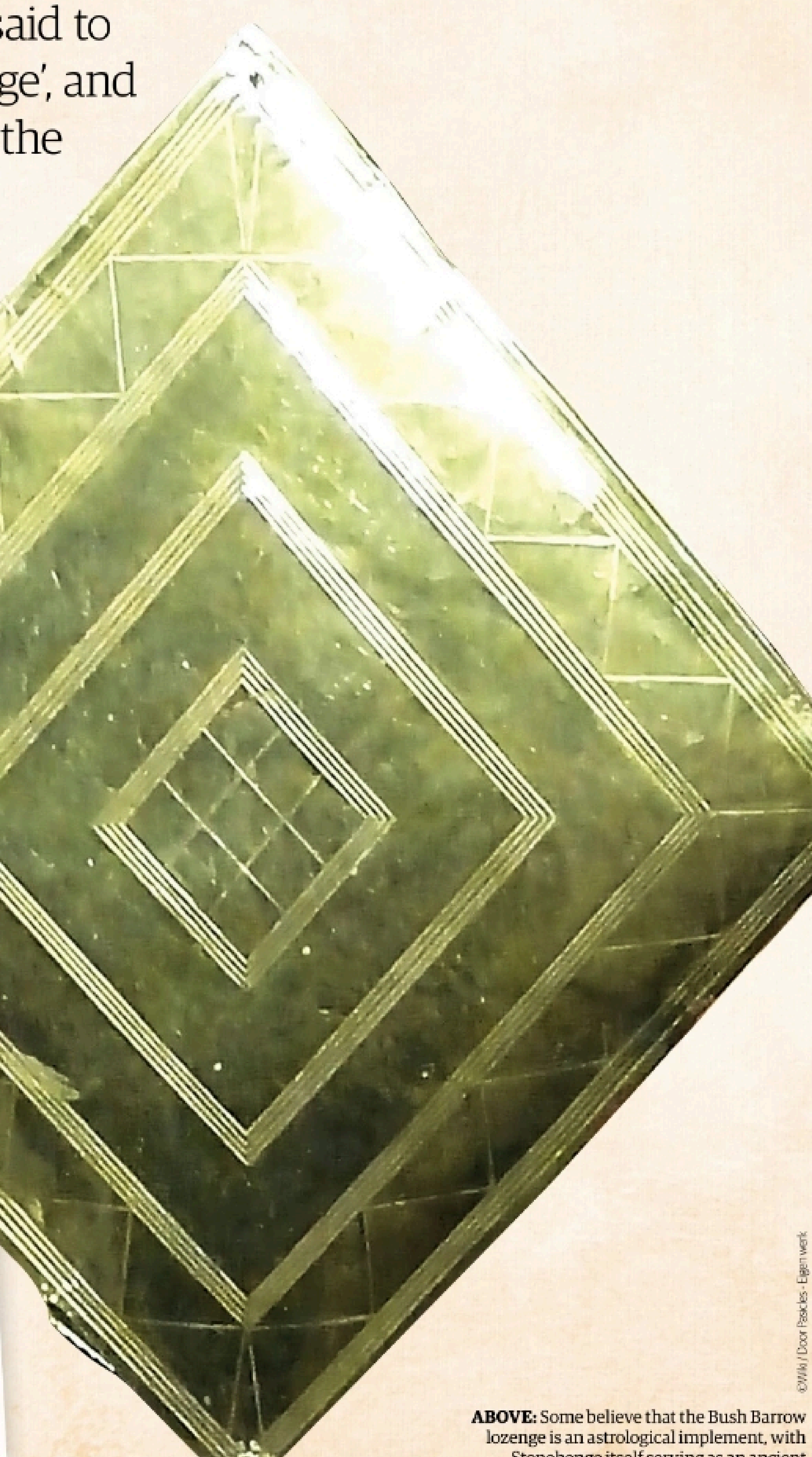
Written by **Dee Dee Chainey**

Bush Barrow lies in Normanton Down, an early Bronze Age round barrow cemetery in Wiltshire, England. This landscape was an important focus of ritual and ceremony during the British Bronze Age as a whole, from 2000 to 700 BCE, and is part of the Stonehenge ceremonial landscape – thus listed within the UNESCO World Heritage Site.

When William Cunnington, a wool merchant financed by Richard Colt Hoare, excavated the site in 1808, he unearthed the richly furnished grave of a man who was six feet tall, who would have towered over his contemporaries in life. Many suggest that this man might have been an important warrior chieftain within the region at the time. The erection of the tall sarsen stone trilithons at Stonehenge predate the burial by around 550 years, as the man died some time around 1950 BCE.

The Normanton Down barrow cemetery, Wiltshire. Bush Barrow was named after the trees planted on top by the antiquarian William Stukeley in the 1720s

©Wiki / Derek Harper



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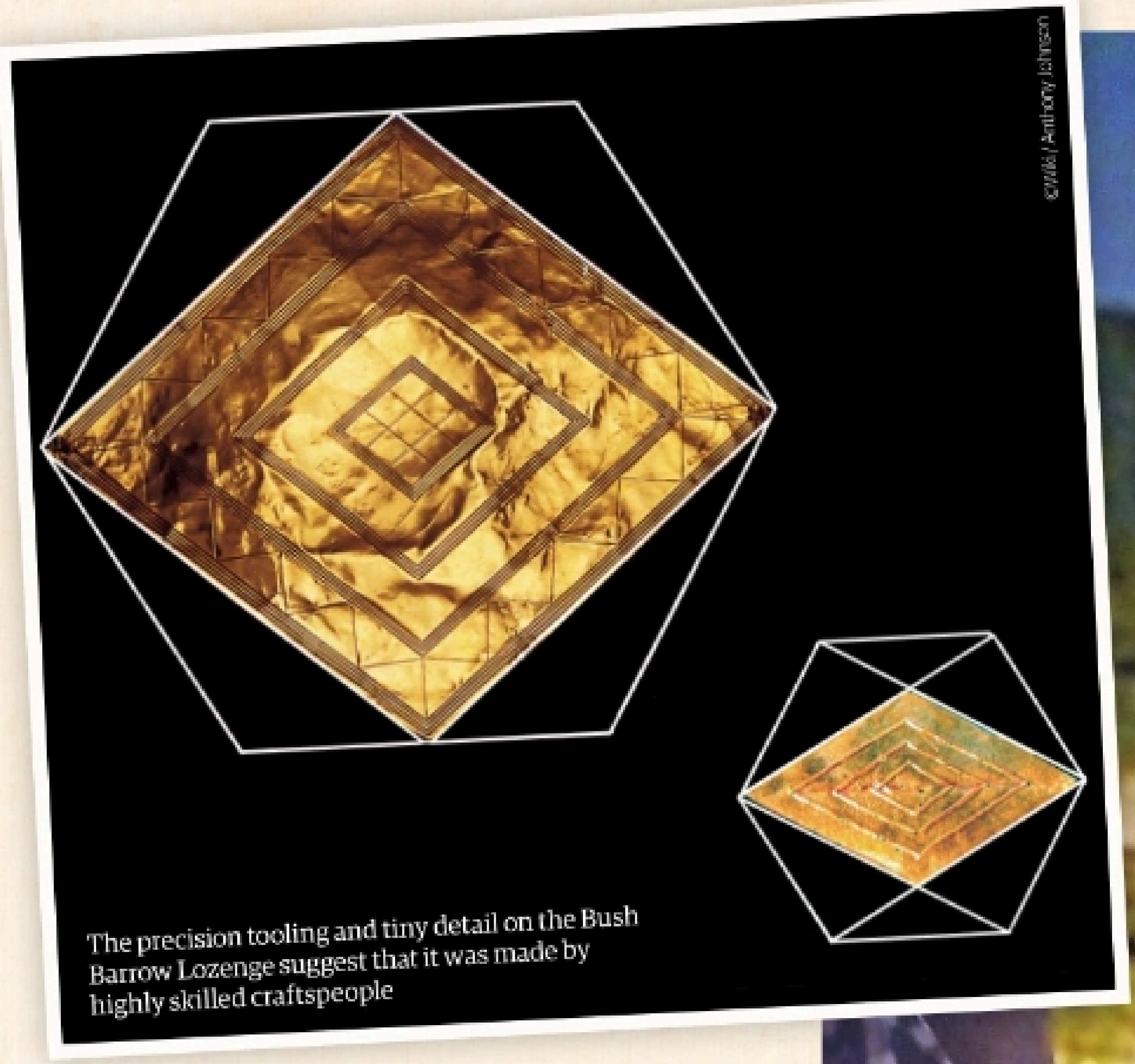
ABOVE: Some believe that the Bush Barrow lozenge is an astrological implement, with Stonehenge itself serving as an ancient astronomical structure



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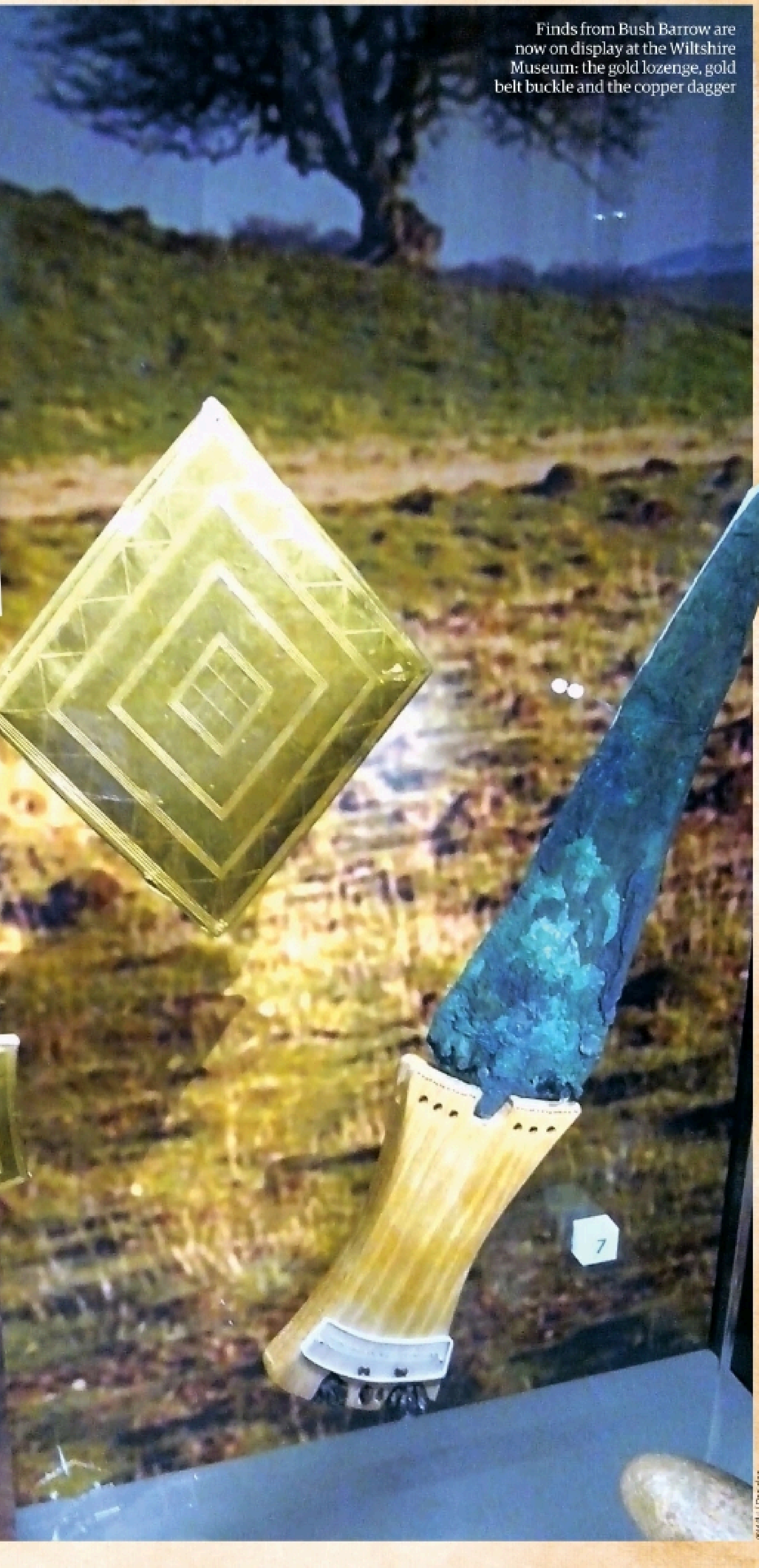
The precision tooling and tiny detail on the Bush Barrow Lozenge suggest that it was made by highly skilled craftspeople



Finds from Bush Barrow are now on display at the Wiltshire Museum: the gold lozenge, gold belt buckle and the copper dagger

©Wiki / Pasicles

> “Experts believe that this is the burial of one of ancient Wessex’s social elite, as only the most celebrated in society could possess an item such as this”

On digging down into the soil, Cunnington found some of the most spectacular grave goods ever discovered in Britain: a polished mace head, five cylindrical bone mounts, and two intricately styled gold lozenges. Recent research suggests that the two daggers of both bronze and gold found might have been made by incredibly short-sighted specialists, who may have started training when children as young as ten. The reasoning behind this is the 140,000 gold pins that decorated the daggers’ pommels are so tiny – just one millimetre long by a fifth of a millimetre wide. Tiny holes would first need to be made in the wooden handle with an awl; they would then be glued into a herringbone pattern with tree resin, held with some kind of tweezers. The pins are thought to have been made in Ireland by Breton craftspeople. Experts believe that this is the burial of one of ancient Wessex’s social elite, as only the most celebrated in society could possess an item such as this, which archaeologists think might have taken up to 2500 hours to make. Some have described these Bronze age skills as the ‘work of the gods’. The large gold lozenge, along with its smaller counterpart, is another fascinating piece, made up from a piece of wood overlaid with a gold sheet, and marked with carefully engraved patterns. Its form and decoration are thought to have been produced by repeatedly drawing hexagons within three concentric circles, revealing an extensive ancient knowledge of geometry. And when standing on Normanton Down, it’s said that there is a clear view over to Stonehenge in the distance. We can only wonder if the richly, mysteriously buried Bush Barrow warrior was ever believed to watch over this sacred site in his death slumber.

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TRADE IN THE BRONZE AGE

The Bronze Age was not one of isolated states acting alone - trade brought products, knowledge, and cultural flow to a changing world

Written by Ben Gazur

If you want to make bronze then the first things you need are the raw ingredients of copper and tin. Copper is a fairly commonplace metal that should prove no difficulty to find, but tin is a fair rarer commodity. Major sources of tin in the ancient world were few and far between. For a bronze maker in Mesopotamia the deposits of tin in Cornwall or Yunan might as well have been on the Moon. If you wanted to make bronze, however, you had to find some way of bringing the tin to you. The Bronze Age peoples developed networks of trade that reached across continents and drove innovations to speed up the transfer of goods.

THE TIN TRADE

The earliest Bronze Age items appear to be objects designed to show off the aesthetic qualities of the metal. Polished bronze has a beautiful warm golden colour but with far more strength than copper or gold. Drinking vessels and ornaments were the first things crafted from bronze. For these rare items only small amounts of tin would be needed to produce them. Over time, however, when prestige weapons were made from bronze, it was soon realised that bronze cutting edges were far more durable than the stone or copper ones in use before. To equip armies would require far more tin than was readily available.

In Mesopotamia, where the Bronze Age first began, there are no obvious sources of tin. Evidence of tin mining can be hard to find archaeologically as the most commonly used ore of tin, cassiterite, was probably gathered from riverbeds in much the same way as gold is panned. This activity would leave few remains for historians to discover. If there was tin in the region it was soon completely exploited and other sources of the vital metal had to be sought out.

Excavation of sites like Deh Hosein in Iran show just how extensive tin mines could be. Covering several square kilometres the mine features 75 large pits that were dug to extract both tin and copper ores. Tools and fires found at the site show the ore was processed locally into metal in the 2nd millennium BCE, and analysis of bronze items found in Mesopotamia reveal this may have been the source of some of the tin used there. Earlier objects would have used tin from elsewhere, probably from mines in modern day Afghanistan.

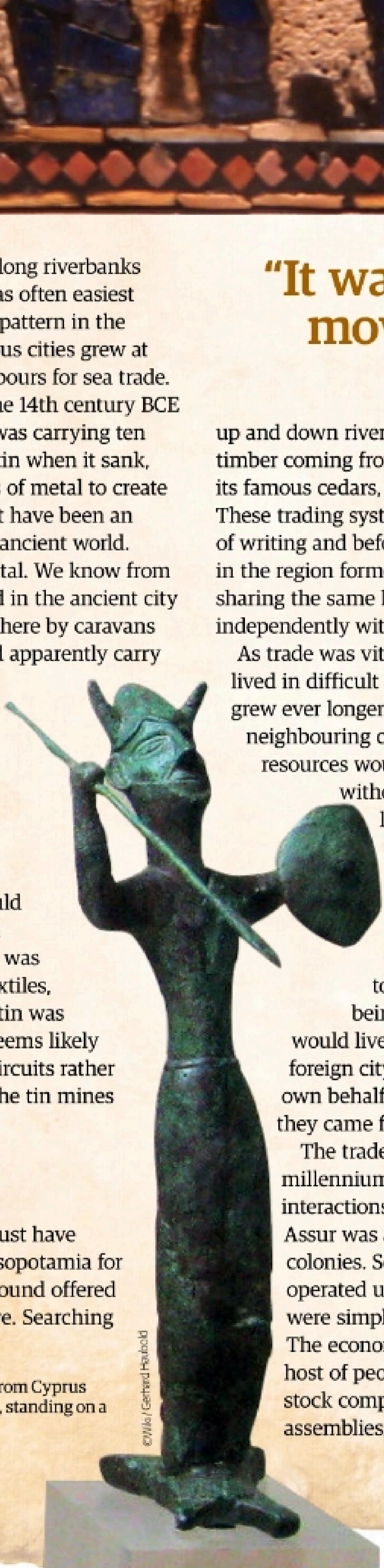
How tin was transported the hundreds of miles from its source to the places where it was finally used is a question that is still debated by archaeologists. In Egypt, Mesopotamia, and the

Onagers, wild and aggressive asses, were first used to transport goods before horses were domesticated

Indus Valley cities sprang up along riverbanks because transporting goods was often easiest on the water. We see a similar pattern in the Mediterranean where prosperous cities grew at places that offered natural harbours for sea trade. The Uluburun ship wreck of the 14th century BCE found off the coast of Turkey was carrying ten tons of copper and one ton of tin when it sank, exactly the correct proportions of metal to create 11 tons of bronze. The sea must have been an important path of trade in the ancient world.

Overland routes were also vital. We know from 19th century BCE tablets found in the ancient city of Assur that tin was brought there by caravans of donkeys. Each donkey could apparently carry around 65 kg of tin in the form of standardised ingots. We are told that gold and silver were taken east and tin was brought back. Some texts give the value of goods being transported in terms of the tin they could buy. We see here the webs of trade that could form, with goods flowing from one area to another. Where tin was common, luxuries like gold, textiles, and spices would arrive while tin was disseminated ever further. It seems likely that traders operated in little circuits rather than travelling all the way to the tin mines so far away.

"It was probably to keep stock of all the moving parts in complex trade that writing first developed"



This 12th century BCE bronze statue from Cyprus shows an armed figure, possibly a god, standing on a metal ingot to protect it

©Wiki / Gerhard Haubold

TRADE AND CIVILISATION

Before the trade in tin there must have been an extensive trade in Mesopotamia for wood. The desert and stony ground offered little chance for forests to thrive. Searching up and down rivers and across land routes led to timber coming from places like Lebanon, with its famous cedars, to construct towns and ships. These trading systems formed before the invention of writing and before the Bronze Age began. Cities in the region formed a quasi-empire with all sharing the same language and religion but trading independently with each other.

As trade was vital for the survival of people who lived in difficult situations, the chains of trade grew ever longer. While you might conquer a neighbouring city for plunder and tribute, some resources would be forever beyond your reach without mutual trade. When tin and lapis lazuli were desired from Afghanistan, only cooperation and exchange could bring them to Mesopotamia and beyond.

Trade involved merchants settling in ports and other cities to facilitate, and pay for, goods being moved. Often these traders would live together in a specific part of the foreign city to conduct trade both on their own behalf but also as directed by the city they came from.

The trade centre of Assur in the early 2nd millennium BCE reveals the complexity of interactions that managing trade required. Assur was at the centre of around 40 trade colonies. Some of these were large and operated under a local council while others were simply posts for exchanging products. The economy of trade involved a whole host of people from investors in joint-stock companies, to merchants, to the city assemblies, to those who ran the ports and led the caravans. It was probably to keep stock of all the moving parts in complex trade that writing first developed.

Many ancient writing systems, such as Linear B in the Mycenaean world, seem to have been mostly restricted to administrative tasks. No Linear B inscriptions deal with poetry or other imaginative arts. For the first several hundred years after the invention of writing in Mesopotamia too it was linked purely to trade and stock-keeping. This would allow tallies to be kept and deals to be struck at long distance. Of course, once writing was used for simple trades it developed into a more nuanced form of communication that could carry more and more information.

When one trader in around 1750 BCE felt he had been treated unfairly in a deal he sent a cuneiform tablet, which is the earliest complaint letter we have. Nanni wrote to Ea-nasir to say "When you came, you said to me as follows: 'I will give Gimil-Sin (when he comes) fine quality copper ingots.' You left then but you did not do what you promised me. You put ingots which were not good before my messenger (Sit-Sin) and said: 'If you want to take them, take them; if you do not want to take them, go away!'" Not liking this situation, Nanni sent men to collect his money, but Ea-nasir would not give it back. We will never know what came of this matter but writing was a key invention that has recorded details of trade for us that would otherwise have been unknown.

How could trade take place if there was no common ground for communication? It was all very well to write a letter to someone, but you had to be sure they could read it. Throughout the Near East from 2600-1500 BCE, Akkadian served as the lingua franca that facilitated commerce between peoples. Even after Akkadian ceased to be a spoken language it served as the official local language of diplomacy and was used between Egypt, Babylon, and other states.

Where language was not shared there had to be lessons on how to communicate. Bilingual texts would help people to understand each other. In the city of Ebla vast numbers of tablets have been found that have writing in both Sumerian and the spoken Ebla language on them. Crucially, both use cuneiform to record their messages, but the Ebla inscriptions use cuneiform to write phonetically. Many of the texts found at Ebla were lists of Sumerian words and practice clay surfaces used in the training of the scribes who helped administrate the trade routes. We also have copies of the *Urra=hubullu*, a glossary of words recorded in both Sumerian and Akkadian, that covers everything from shipping to beer to allow texts in both languages to be read.

Of course if you are going to perform trade you have to have something to exchange. The earliest form of trade was bartering one good against another. A more efficient way of keeping track of wealth was required for those unable or unwilling to transport heavy goods themselves. Money is the root of all commerce. In Mesopotamia the shekel, a weight related to a set amount of barley, was used to keep trade fair. Prices and fines were often levied in shekels of silver. When transporting tin, large amounts were carried as ingots sealed within textiles but loose, or 'hand tin,' could be used to buy things along a caravan's route. In other cultures objects were given nominal values to facilitate trade. Bronze Age China saw the use of cowrie seashells as a form of money.

Mathematics was a direct outgrowth of trade in the ancient world. Keeping track of what is coming in and going out requires at least the ability to record additions and subtractions. The earliest trade accounts from Uruk show simple recording of items on clay tablets. If ten sheep arrive you mark the tablet with ten images of a sheep. To replace this cumbersome system, symbols representing numbers were used. A circle before the sheep meant ten sheep. Mathematics as an abstract field would take millennia to develop but it got its start in trade.

Trade did not only enrich civilisations due to the exotic goods it brought in. When caravans passed through an area they would often have to pay a tax to the local ruler. In Mesopotamia a tax known as the 'miksum' was charged on caravans - often at a rate of 10 per cent of the cargo. For rulers, trade could be a vital source of income.

INTERNATIONAL RELATIONS

Studies by anthropologists in the Trobriand Islands showed how gift-giving between rulers can be a stimulus to trade. Known as Kula exchange, the gift-giving involved often dangerous trips across the ocean to pass necklaces and bracelets to other islands. At first the gift-giving seemed pointless, but it was discovered that those who

PHOENICIANS IN CORNWALL

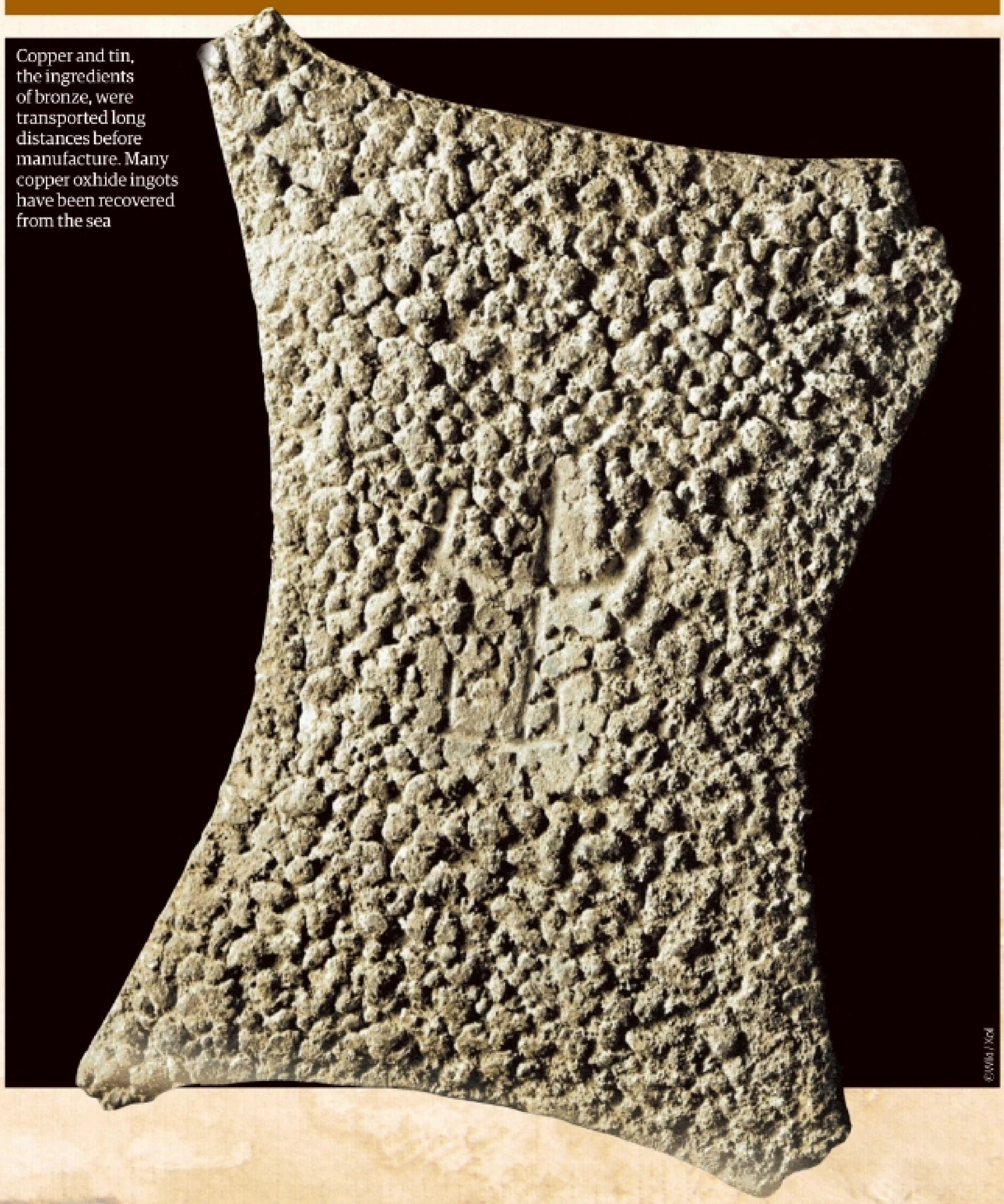
The Greek historian Herodotus wrote in the 5th century BCE that "I cannot speak with certainty, however, about the marginal regions which lie toward the west, in Europe... Nor am I certain of the existence of the Cassiterides Islands, from which we get our tin... In any case, the far edges of the world are the source of the tin and amber that come to us." He knew that tin was not native to the Greek world but only had the vaguest idea of where it did come from. That Cornwall in Britain has a large supply of tin has led to speculation that it was visited by traders thousands of years ago.

Tin mining in Britain has been dated to around 2000 BCE. The Nebra Sky Disk found in Germany was found to contain both gold and tin from Cornwall, showing that either goods from Britain were finding their way to Europe by at least 1650 BCE.

By studying the isotopes of metals found in tin ingots in ancient Mediterranean sites, researchers have identified European tin deposits as their source. One ingot from Israel, dating from the 13th century BCE, was found to be of probably Cornish origin. Did the Phoenicians sail to Cornwall, or was it transported overland? That remains a mystery.

The Nebra Sky Disk is the oldest confirmed image of the night sky and was made with Cornish tin and gold

©Wiki / Dbachmann



Copper and tin, the ingredients of bronze, were transported long distances before manufacture. Many copper oxhide ingots have been recovered from the sea

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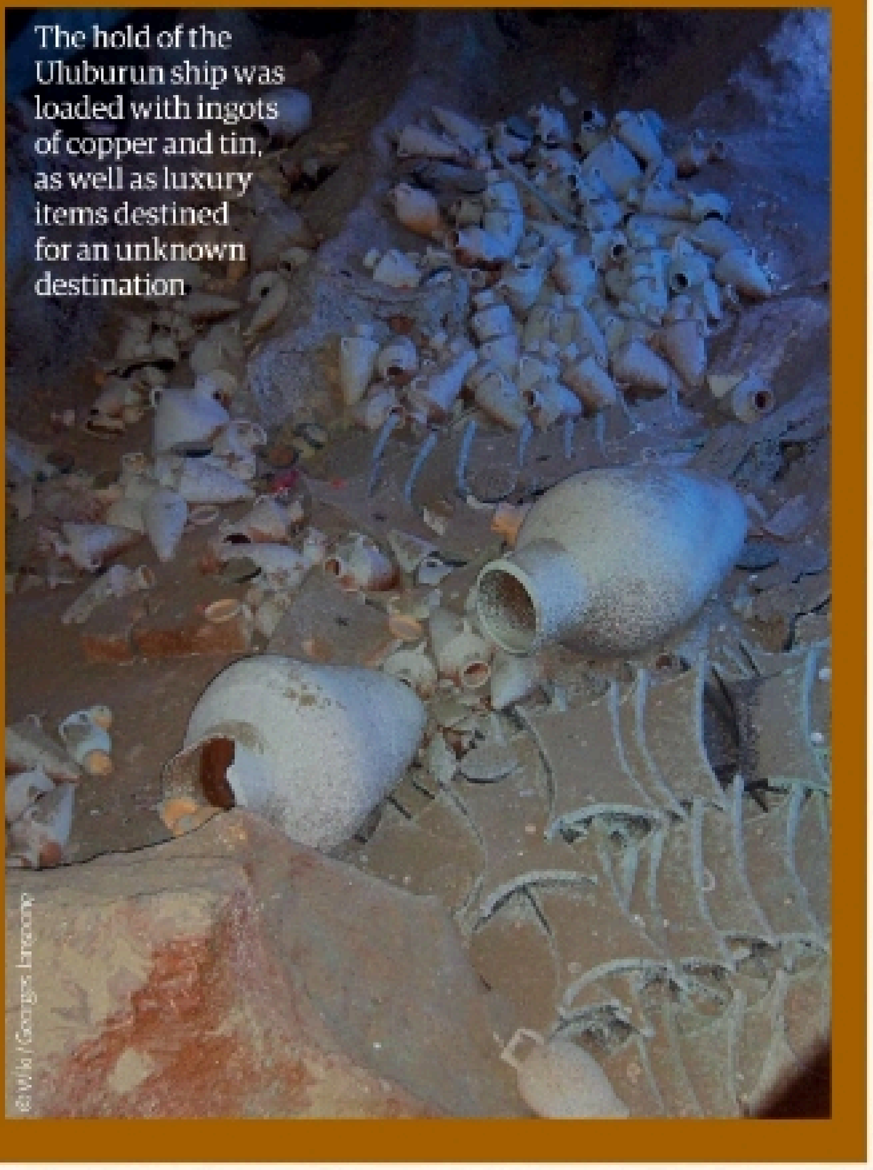
THE ULUBURUN WRECK

The Uluburun shipwreck was one of the most significant archaeological finds of the 20th century. Over several years of painstaking underwater excavation, which involved over 22,000 dives, the remains of the vessel were revealed. For the first time a Bronze Age ship was found with its cargo intact. The 18,000 recovered artefacts gave an extraordinary view into trade in the 14th century.

Until a local sponge diver stumbled on the remains scholars doubted that large shipments were made over sea in the 14th century BCE. The ship itself is the earliest known example of a vessel made with mortice and tenon joins in the wood. On board the ship were 20 tons of goods, which included 11 tons of copper and tin: the precise amounts required to convert them to bronze. Alongside this were ingots of blue glass that could be melted down to create exotic glassware. Terebinth resin in Canaanite jars was found beside Egyptian ebony, hippo teeth, and jewels. A gold scarab bearing the name of the Egyptian queen Nefertiti was also brought up.

No one knows where the ship was going to or from with such a valuable load, but its international cargo shows just how much trade was occurring at the time.



The hold of the Uluburun ship was loaded with ingots of copper and tin, as well as luxury items destined for an unknown destination

© Wiki / Georges Jansoone

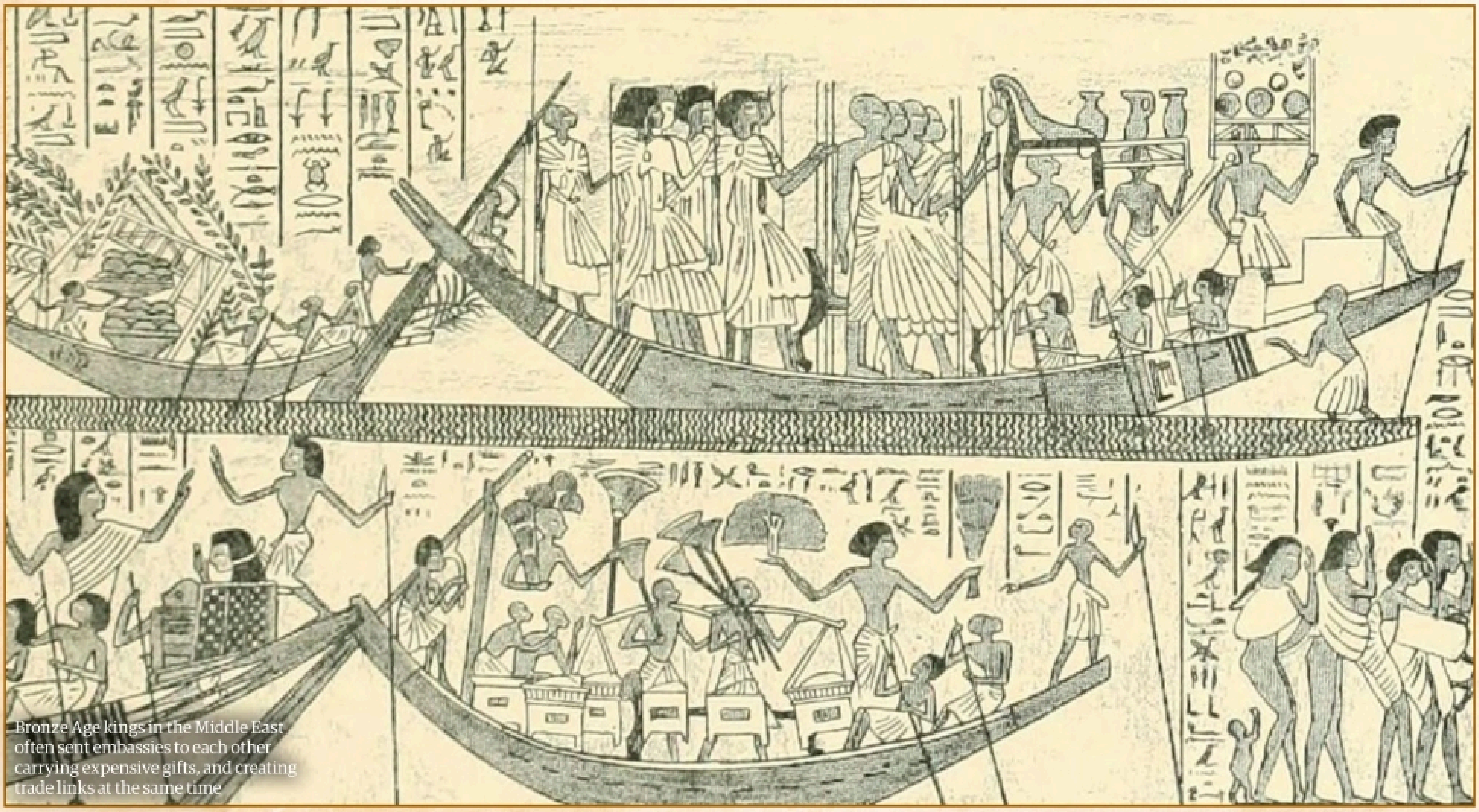
went on such voyages also bartered other goods on their journeys, and so trade was facilitated between otherwise isolated places. Something similar seems to have occurred in the Bronze Age Mediterranean too.

We know from textual evidence that gift-giving was a common form of diplomacy between rulers in the Bronze Age. The Amarna texts from 14th century Egypt record how the Mitanni king Tushratta thought the pharaoh Akhenaten was not participating in the gift-giving that was expected as he had once done. "May my brother grant me more than he did my father and send it to me. You sent my father much gold. You sent him large gold jars and gold jugs. You sent him gold bricks as if they were just the equivalent of copper." The caravans that carried these gifts would no doubt have borne other commodities with them too.

Since nations needed goods from each other that were otherwise unavailable, they had to find ways to deal with each other. Embassies often accompanied the gifts between kings and treaties resulted from these meetings which created alliances and allowed for trade. Following the battle of Kaddesh a peace treaty was signed between the Hittites and the Egyptians, which called for "eternal peace." It may not have achieved that but it would at least have allowed trade between the two nations to carry on, possibly to the detriment of their rivals.

We do have hints that trade may have been used as a weapon at times. Perhaps the first embargo in history seems to be recorded between the Hittites, the Assyrians, and the 'Ahhiyawa' -

> "Since nations needed goods that were otherwise unavailable, they had to find ways to deal with each other"



Bronze Age kings in the Middle East often sent embassies to each other carrying expensive gifts, and creating trade links at the same time

In Bronze Age China cowrie shells, or bronze imitations of them, were used as a form of money to make trading easier

possibly the Mycenaean Greeks. In a treaty from around 1225 BCE the Hittite king wrote that the king of Amurru, on the coast of Syria, was to share the Hittites' enemies. "Your merchant shall not go to Assyria, and you shall not allow his merchant into your land." Also "You shall not allow any ship of the Ahhiyawa to go to him." It is as if trade drove the rise of nations but also drove them into competition against one another.

THE MECHANICS OF TRADE

As well as dealing with outsiders and trade, it was vital for a king to regulate what was going on within his own land if he was to take his ample share of the goods. Laws were promulgated by Bronze Age king Ur-Nammu, which aimed to control what we would think of as criminal activity, such as how large a fine a man was to pay if he bit off another man's nose. But in the preface to his law code, the earliest surviving, he tells us how he codified the weights and measures used in trade. "I standardised all the stone weights from the one shekel to the one mina."

While rulers sought to control and profit from trade it was people of a lower class who actually had to perform the act of moving goods around. When you put a person to work they will always look for ways to make it easier and more efficient, and traders advanced many areas of technology in this pursuit.

Before the start of the Bronze Age cattle had been domesticated in several regions. The brute strength of the ox was a powerful aid in agriculture and to some extent in transport, but their slowness and surly nature made them awkward animals for transportation. In Mesopotamia oxen were used to drag sledges but it was the discovery that the wheel, previously used to turn clay, could be used on wagons that opened up new avenues for travel. At first wheeled carts were pulled by people or oxen but soon the wild ass, or onager, replaced them. Famed for their aggressive temperament the onager was more suited to pulling chariots in battle than in trade.

Horses, equivalent in size to our ponies, were probably first domesticated on the Eurasian steppes around 3500 BCE and were soon harnessed for swift transport of messengers and goods. In Central Asia and Somalia camels were first tamed around 3000 BCE and proved key to moving merchandise across difficult terrain.

Before beasts were pressed into service as pack animals the most efficient means of transport was the boat. Canoes are found around the world and from well before the Bronze Age but the first sailing ships probably emerged in Mesopotamia and Egypt around 5500 BCE. The presence of rivers bisecting their landscape offered a swift method of moving large amounts of grain and other necessities of life. As the Bronze Age developed and the need for tin became paramount, ships had to extend their range. Reed boats were replaced with sturdier wooden ones that were more able to withstand the rough sea.

Reeds from Egypt also furnished their boats with the ropes required to manage their sails and used to lash the planks together. In the burial barge of the Pharaoh Khufu up to a mile of rope would have been needed to lash it together. Images from Egypt show workers using specialist tools to create their ropes and cordage. In Bronze Age China, hemp was the preferred material. Knowledge of rope making seems to have spread east and west as it travelled alongside the goods it was strapping down.

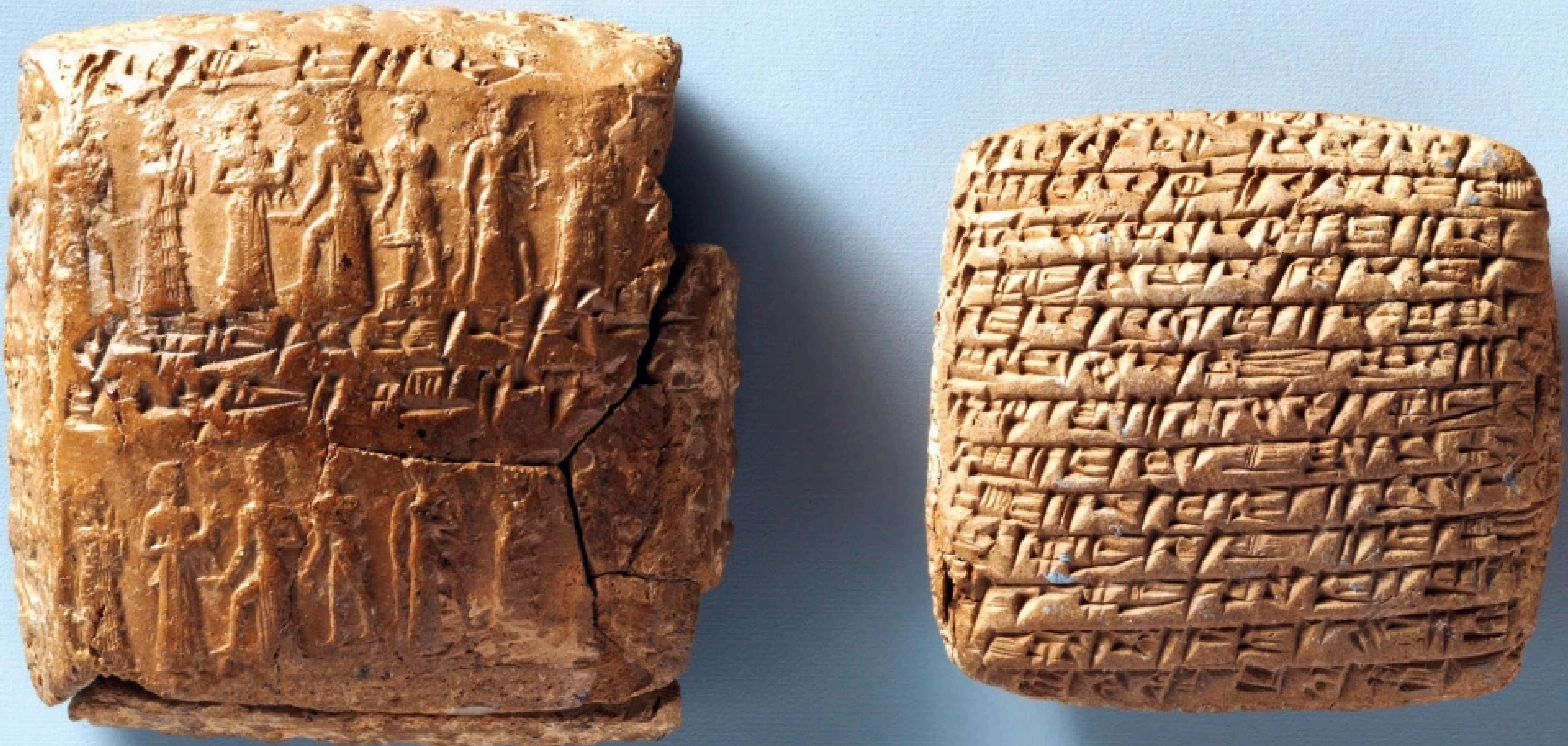
INTELLECTUAL TRADE

It was not only physical objects that made their way across land and sea in the Bronze Age. Unseen and untaxed ideas were carried along the trade routes between nations too. When Pharaoh Thutmose III wanted to decorate his newly built palace he did not adopt classical Egyptian style throughout. On one wall a fresco has been found that shows in vivid reds and blues youths leaping over bulls. Previously this imagery had only been found on Crete from Minoan sites, yet here it is over 500 miles away in Egypt.

Were the artists who created the Egyptian frescoes Minoan themselves, or trained there, or just influenced by art they had seen? We will likely never know, but we can be certain that art, culture, and religion flowed along trade routes as easily as tin or copper.

This figure from 2200 BCE Ur is made from gold and imported lapis lazuli that would have come to Mesopotamia from Afghanistan

© Wiki/Torquatus

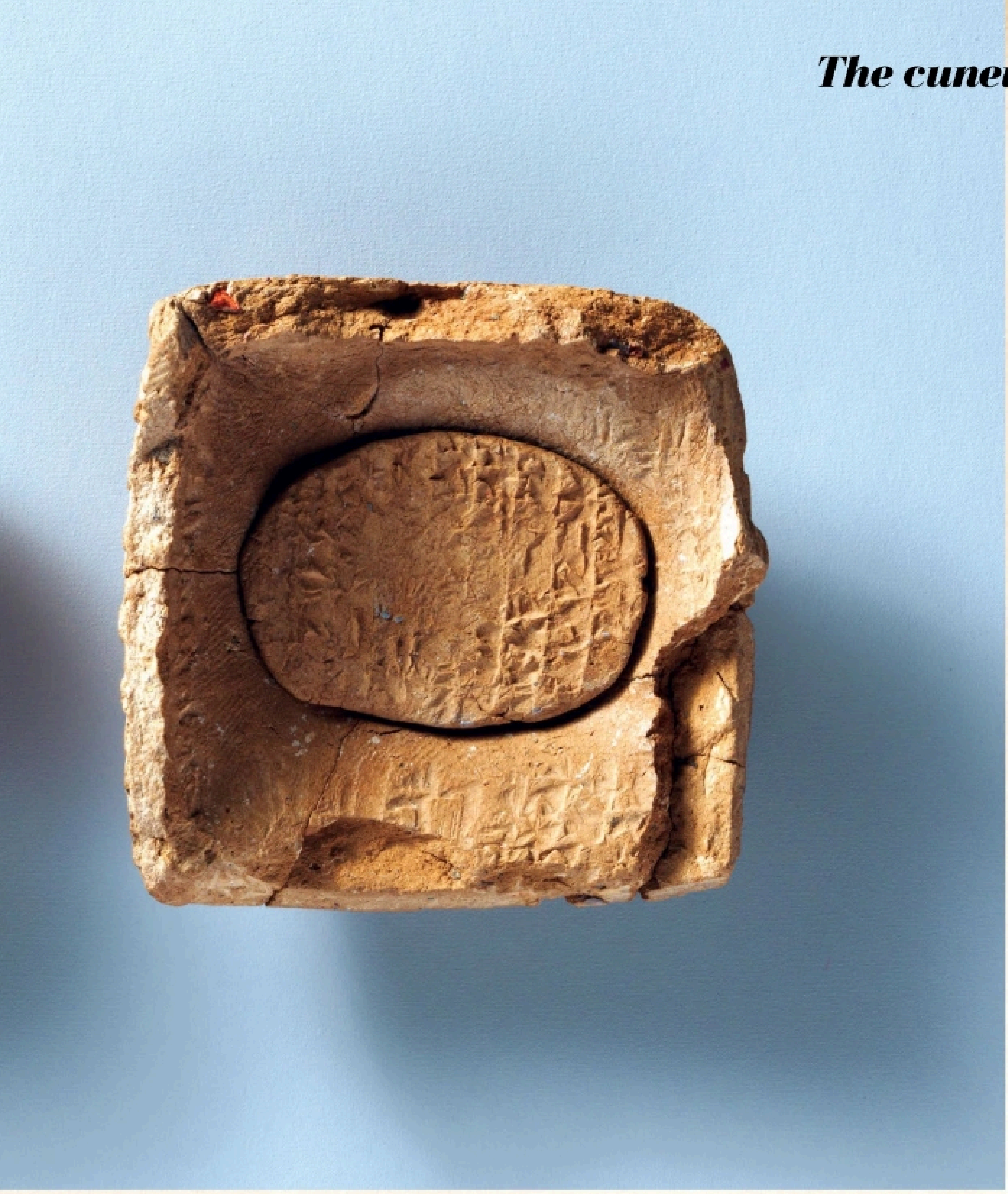


Ashur-muttabbil used all of the space on the first tablet, including the edges, before moving on to the small oval to finish the letter to his wife

THE CUNEIFORM TABLETS OF KÜLTEPE

From trading records to family letters, these ancient tablets contain some of the first writing in the world, unlocking the secrets of an ancient civilisation

Written by **Dee Dee Chainey**



Under the beating sun of Turkey, just north-east of the modern day city of Kayseri, lies the ancient site of Kültepe. Here, a huge tel rises out of the earth, towering over an Assyrian town which lies below. This site was an important middle Bronze Age trading colony in the Near East during the second millennium BCE. Famous for the sheer number of cuneiform tablets discovered within its walls, it is the site where the earliest examples of the Hittite language have been found to date, and the first evidence of any Indo-European language discovered in the world. Such tablets were preserved after a fire engulfed the city in around 1836 BCE, preserving a glimpse into everyday life within these households as a snapshot in time with the ensuing destruction. More than 23,000 tablets have been excavated.

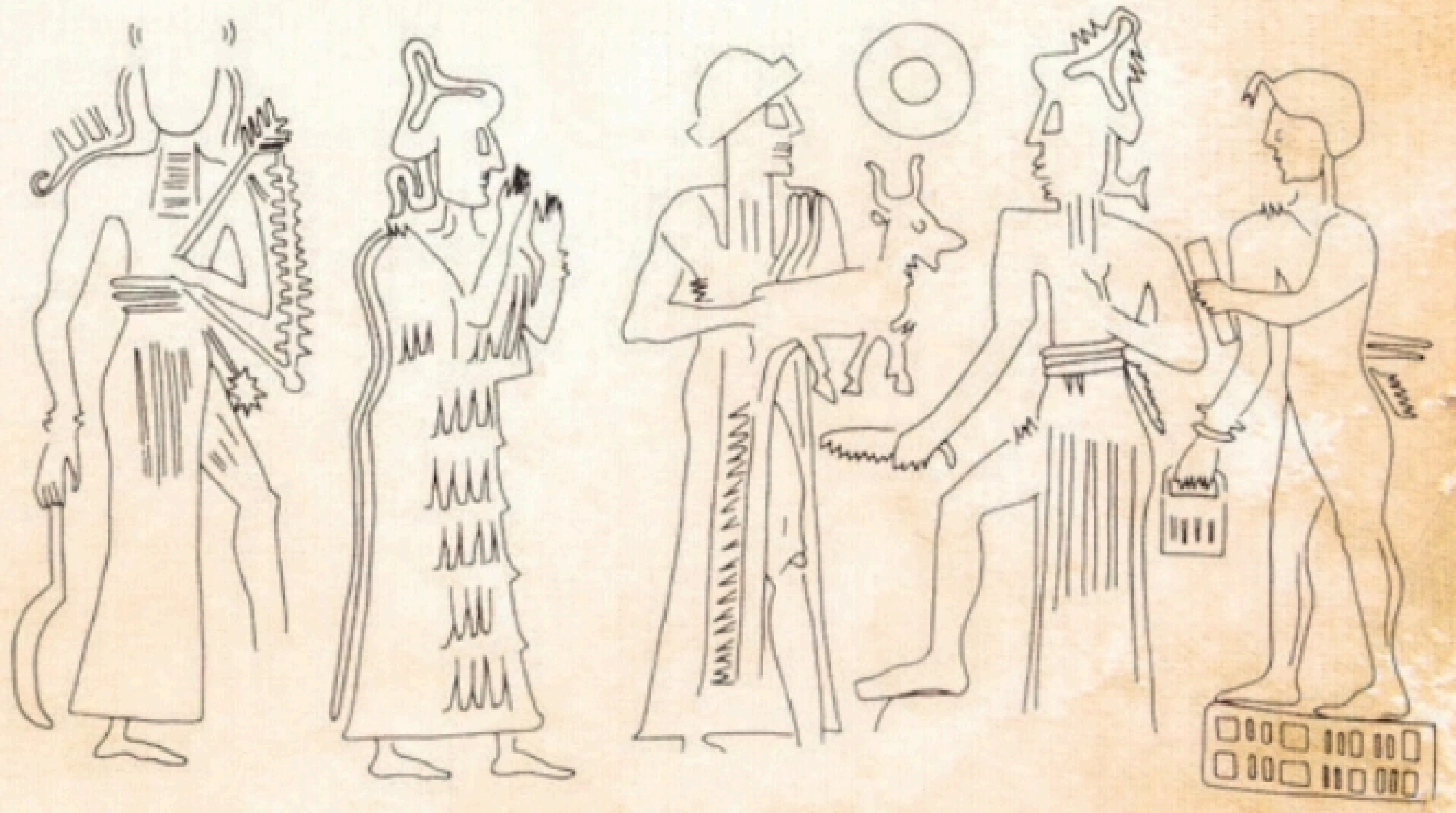
Many of these tablets chart the everyday transactions and disputes of traders and merchants, who travelled far from their homes in Ashur to conduct business within the vast network of trading settlements distributed throughout the area. From such records we know of the widespread trade in metals, and the daily dealings that took place for these men. Yet a few tablets stand out from the others, giving a much deeper insight into their personal lives, in the form of family letters which preserve the intricacies of ordinary life for these merchants who lived away from home for extended periods.

One such tablet now lies in the New York Metropolitan Museum of Art. This tablet, unlike many others, is comprised of two parts that make up one long letter from a merchant named Ashur-muttabbil, encased in a clay envelope. The letter is to resolve a dispute about slave girls, and addressed to his wife, amongst others.

What is astonishing about this tablet in particular is the insight it provides into the intimate life of a man and wife, as well as the integration of populations. While Ashur-muttabbil is clearly an Assyrian, his wife's name is Kunanniya - an Anatolian name, revealing that he - like many other merchants - chose to marry a local woman. With the appearance of personal names comes the ability to trace the couple's story through their lives. Later, on other tablets, it is sadly revealed that Ashur-muttabbil soon died, leaving Kunanniya to a troubled life alone, at the behest of her remaining family and in-laws.

In 2015 the Kültepe tablets were added to the Memory of the World Register, recognising their universal significance. They will go down in history for the insights their secrets reveal.

"These family letters preserve the intricacies of ordinary life"



ABOVE: The envelope of Ashur-muttabbil's letter was decorated with his seal, showing the sun god being worshipped, stamped by rolling a cylinder seal over the clay twice

©Wiki / Klaus-Peter Simon

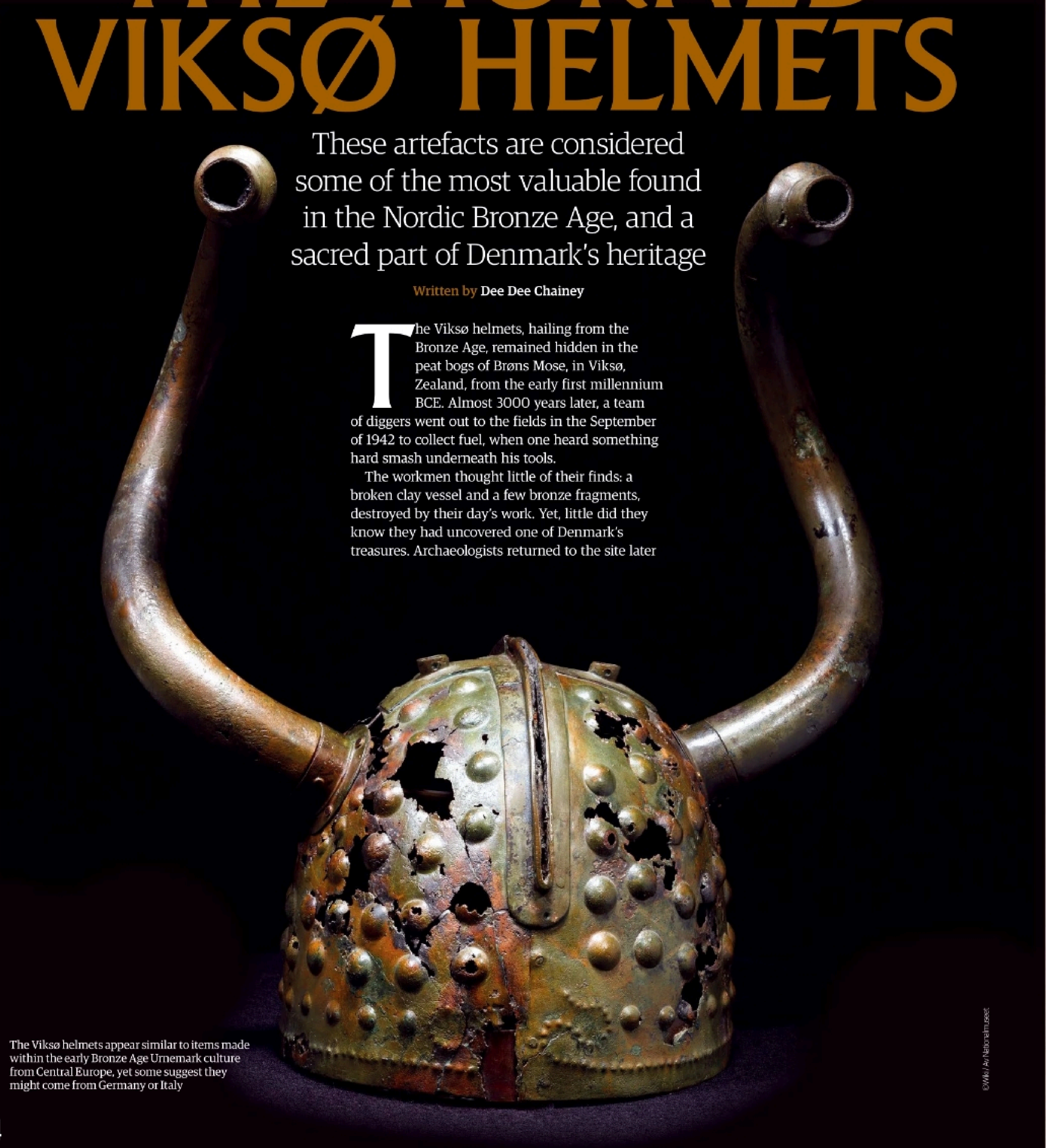
THE HORNED VIKSØ HELMETS

These artefacts are considered some of the most valuable found in the Nordic Bronze Age, and a sacred part of Denmark's heritage

Written by **Dee Dee Chainey**

The Viksø helmets, hailing from the Bronze Age, remained hidden in the peat bogs of Brøns Mose, in Viksø, Zealand, from the early first millennium BCE. Almost 3000 years later, a team of diggers went out to the fields in the September of 1942 to collect fuel, when one heard something hard smash underneath his tools.

The workmen thought little of their finds: a broken clay vessel and a few bronze fragments, destroyed by their day's work. Yet, little did they know they had uncovered one of Denmark's treasures. Archaeologists returned to the site later



The Viksø helmets appear similar to items made within the early Bronze Age Urnemark culture from Central Europe, yet some suggest they might come from Germany or Italy

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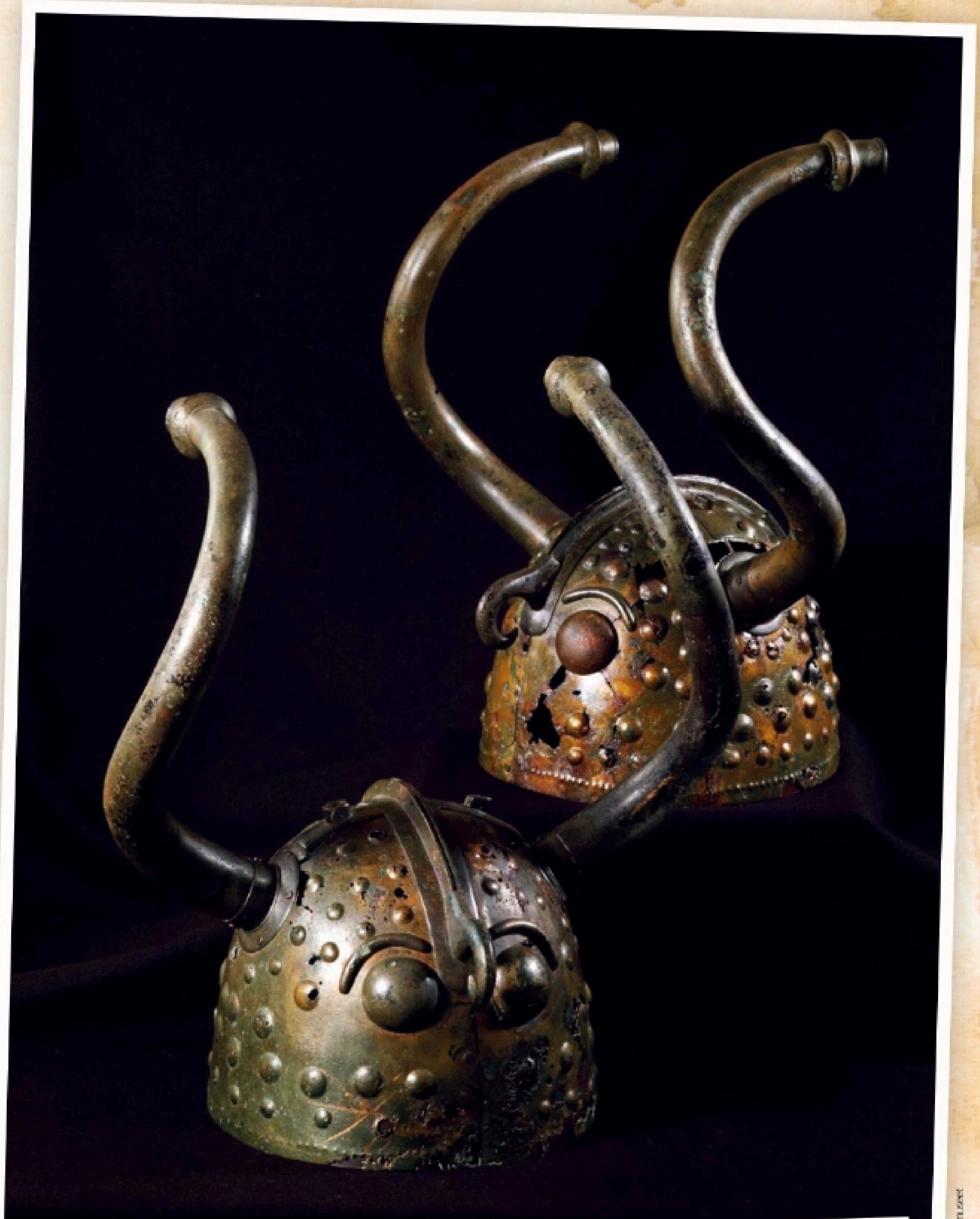
"Decorations on the helmets have been described having grooves on the top for raised combs that may have held hair or feathers"

that year, unearthing more pieces of bronze from the black soil. Little by little, they pieced together the bronze fragments. What emerged astounded them. The pieces formed two bronze helmets unlike anything seen before.

The Viksø helmets are each hammered from a bronze sheet, with the two halves joined by rivets. Decorations on the helmets have been described having grooves on the top for raised combs that may have held hair or feathers, with hooked beaks on the forehead. Two eyes appear on each helmet, with what appear to be eyebrows depicted above. The significance of these features still remains a mystery today, yet they appear strangely bird-like. Interestingly, a bronze statue exists from Glasbacka in Halland in Sweden, thought to depict a figure wearing a bird mask, while a horse's collar from Fogdarp in Scania, Sweden, shows statues of two men with horned helmets. The most prominent feature of the helmets is unquestionably the large horns that protrude from either side, resembling those of the aurochs. One of the helmets was initially found on a tray of ash, yet the reason for this remains shrouded in mystery.

It's believed that the helmets had a ritual function, and were worn during religious ceremonies rather than for battle, since they are too thin to be functional. The fact that they were later discovered within the bog supports this idea, as votive offerings in boglands and other watery places were common throughout the Bronze Age across Europe. It has been suggested that this might have been to beseech the gods for better weather for agriculture, or to appease their anger, at a time when the climate was changing dramatically. These finds predate the Iron Age bog bodies found in Britain, Ireland, Germany, Holland and Denmark, and many suggest continuity between such practices. These too are thought to be offerings or sacrifices to appease the gods. Obviously we can never know the true reason behind such practices, yet there are many parallels of votive deposits being left for deities across many time periods, throughout the world.



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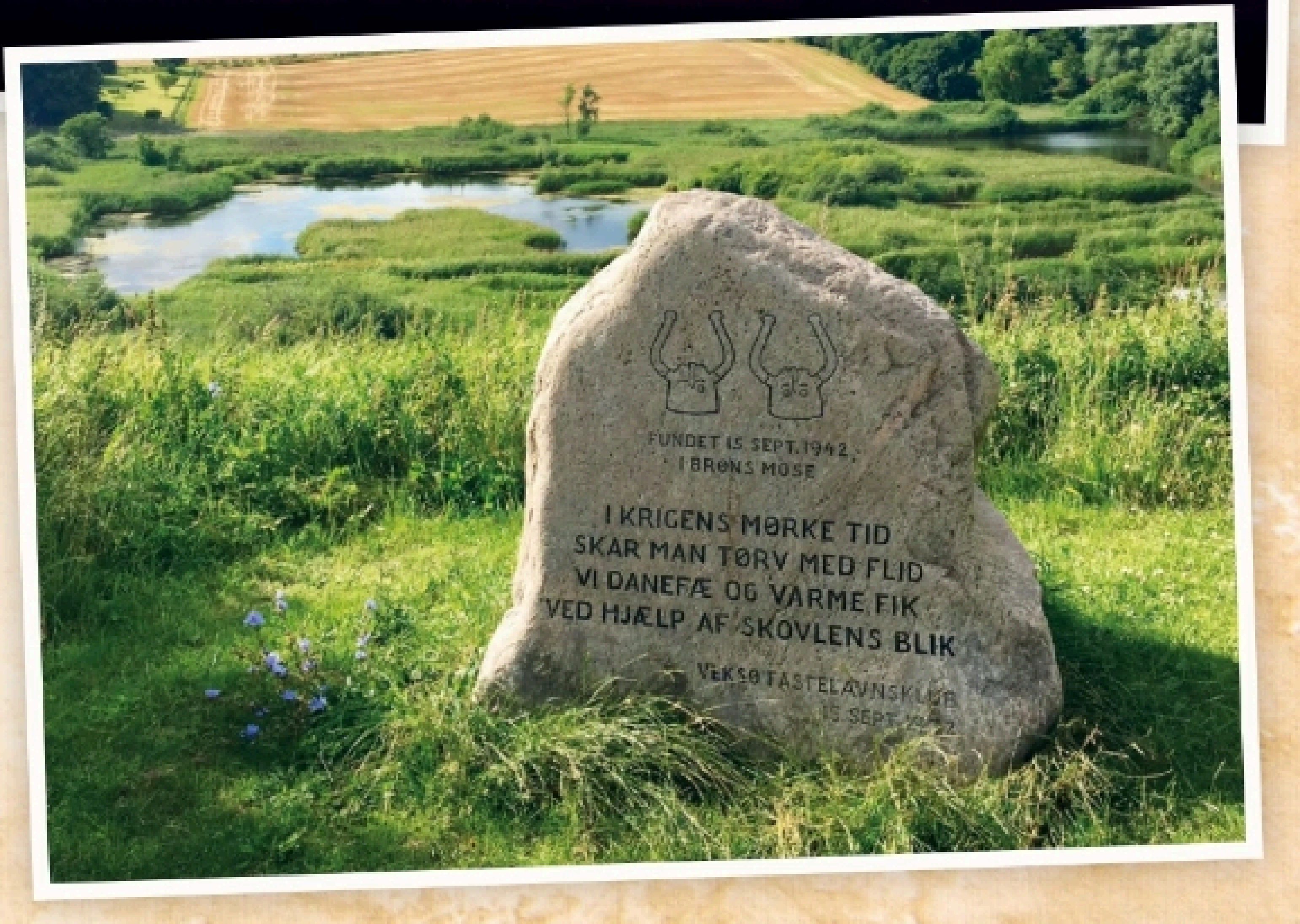
ABOVE RIGHT: It's believed that the helmets had a ceremonial function, as they are far too impractical to be used in the context of battle. Bronze Age Europeans frequently left religious offerings in bogs



©Wiki / Av OrfJus - Eget værk

BELOW RIGHT: A stone was erected at the site where the helmets were found, to remind visitors of the epic discovery made here in Brøns Mose, Viksø

©Getty / Print Collector

ANCIENT WEAPONS AND WARFARE

The history of humanity is the history of war; the development of weapons in the ancient world traces the development of civilisation

Written by Ben Gazur

Humans are, and always have been, inventive in the tools they create to harm one another. A history of humanity could easily be constructed from an examination of the weapons we use. The earliest weapons were constructed from wood and stone, and predate modern humans. We can't know anything about their creation, but through the rise of civilisations and writing we can trace their development.

UP CLOSE

All early weapons' effectiveness depended on the strength on their user. As civilisations appeared, more efficient ways of using that strength were invented. In close combat, blades were the weapons of choice. With the development of metallurgy, daggers, swords, and arrowheads achieved new levels of sophistication.

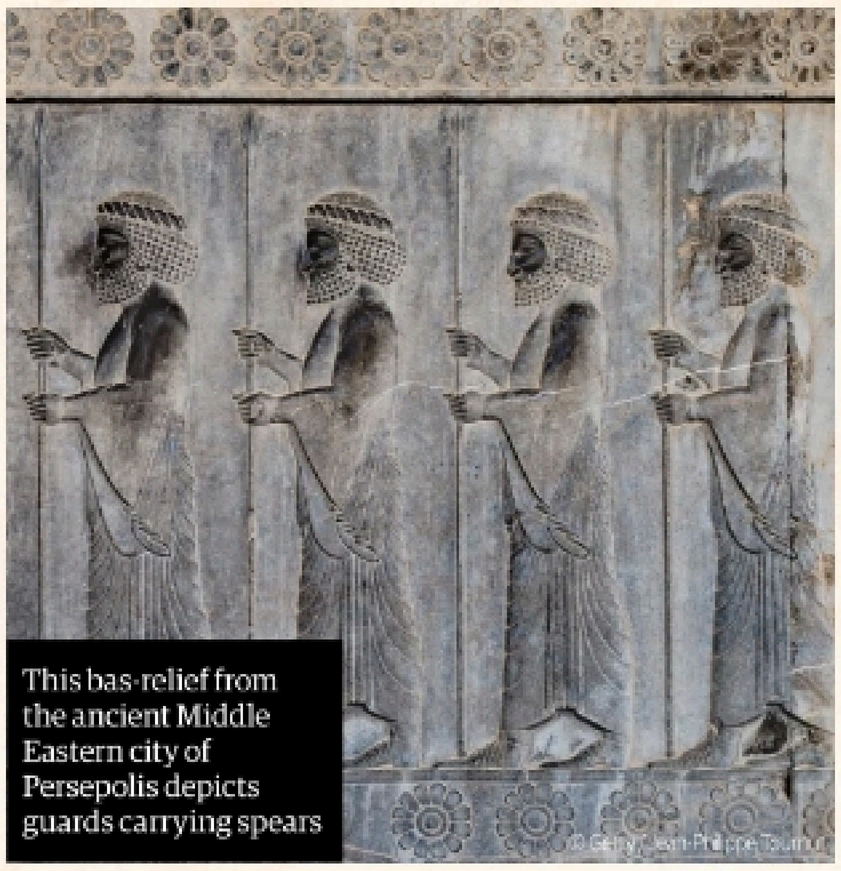
The first major advance in metal weaponry was the development of bronze. This alloy of copper and tin allowed for the creation of slashing weapons and sharp-pointed spears and arrows. Bronze technology spread unevenly in the ancient world, but wherever it went it changed the nature of warfare. The need for bronze led to increased trade – and competition for the resources to make it – across the ancient world. Only with the invention of efficient iron smelting did the Bronze Age finally pass.

Iron could be toughened by the addition of carbon to make steel, which was the real point of transition in military technology. Against steel, bronze had little chance, which is likely why it was replaced. Steel weapons could be complex – the Roman gladius was sometimes made of two types of steel with different levels of carbon, beaten together to create a blade.

Besides the slashing and stabbing of swords, soldiers could use other close-range weapons to kill their enemies. Spears and axes offered different methods. A spear could impale your foe before they even reached you. The Macedonian sarissa, at six metres in length, offered a formidable obstacle to both infantry and horses. If your enemy was armoured then a sword might not have been able to penetrate their defences. A well-swung and heavy axe-head, on the other hand, could crush even the best-armoured foe.

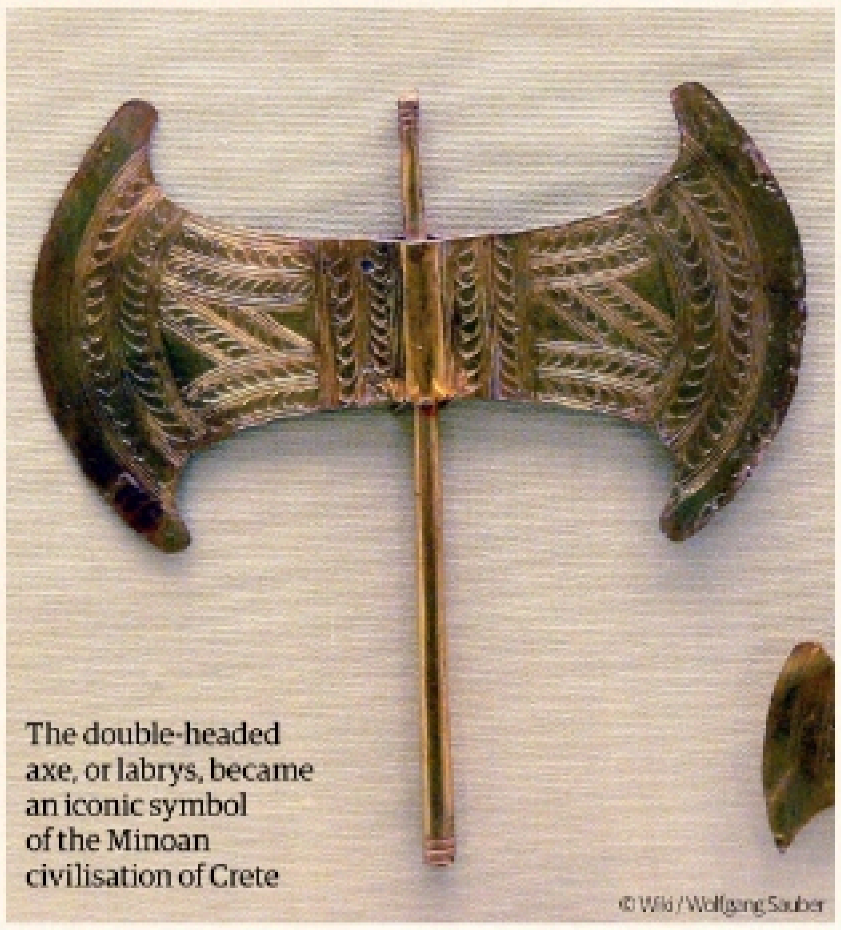
DANGER AT A DISTANCE

Projectile weapons offer users the protection of distance. If you can strike your foe before they can get within a sword length of you, you are more likely to survive. Bows and arrows are known from prehistoric sites, but innovation throughout antiquity improved their power



This bas-relief from the ancient Middle Eastern city of Persepolis depicts guards carrying spears

© Getty / Jean-Philippe Tournut



The double-headed axe, or labrys, became an iconic symbol of the Minoan civilisation of Crete

© Wiki / Wolfgang Sauber

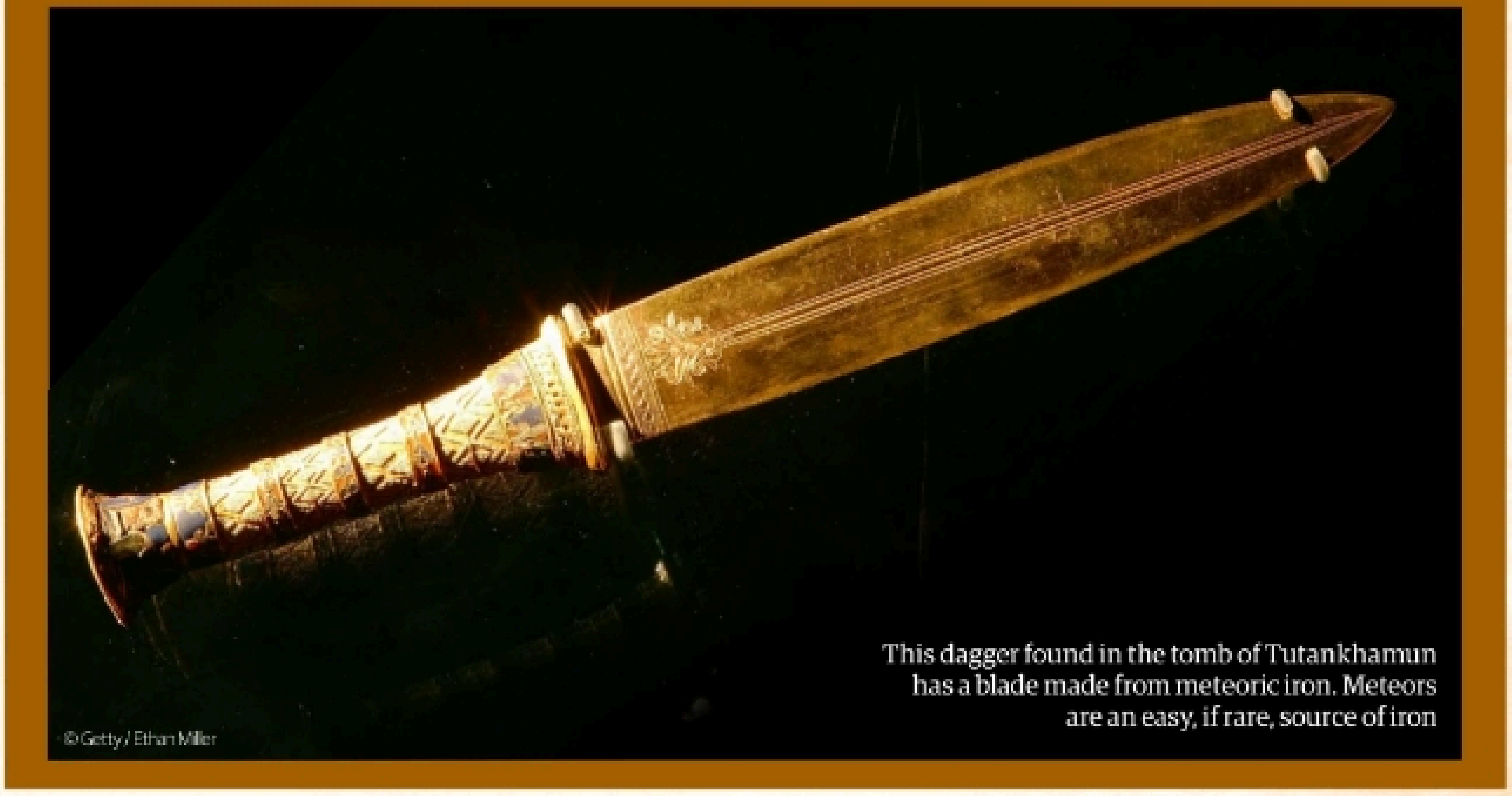
METEORIC IRON WEAPONS

Creating weapons from bronze was a huge advance in weapons technology. Casting allowed metalworkers to create swords, daggers, and arrowheads in a variety of shapes. Bronze armour, although particularly heavy, would offer almost complete protection. The major drawbacks with bronze are that it requires tin to create, and does not hold a sharp edge. With the development of iron smelting (~1300 BCE in the Near East), bronze weapons fell into disuse. Yet archaeologists have discovered iron tools and weapons from periods well before iron could be mined.

These Bronze Age iron artefacts range from daggers from 2500 BCE in Turkey, to axe heads from 1400 BCE found in both Ugarit and China. Where did Bronze Age people get iron from? The answer is from space, though not from aliens. Iron meteorites are able to withstand entry into the Earth's atmosphere. Even to the untrained eye they stand out, and so ancient people would have collected them and known they were special.

While smelting iron ore requires very high temperatures, a lower-temperature furnace will allow you to work iron into a desired shape. Iron, especially iron that fell from the heavens, would have been treated as a prestigious material.

Scientists who discover iron artefacts can analyse them for the relative quantities of other elements in the metal to see whether it is extraterrestrial in origin. A high level of nickel and cobalt points to the iron coming from meteorites. The tomb of Tutankhamun contained a dagger that recent work has confirmed was made from meteoric iron.



This dagger found in the tomb of Tutankhamun has a blade made from meteoric iron. Meteors are an easy, if rare, source of iron

© Getty / Ethan Miller

> "Projectile weapons like javelins were less portable than arrows, but could deliver a much more deadly blow"

and use. The compound bow was made by laminating horn, wood and animal sinew together. This composition of materials made for a more powerful and compact weapon. The origin of the crossbow is debated, but it is widely attested in the Chinese Warring States period (5th-3rd century BCE). Chinese armies of the time would carry large numbers of professionally constructed crossbows with them.

Other projectile weapons like javelins were less portable than arrows, but could deliver a much more deadly blow. A soldier might carry several light javelins to hurl at their opponent as a preliminary to an infantry charge. Other weapons required more specialised training, such as the slingshot. Shooting stones and lead pellets, an ancient sling could do as much damage as a modern bullet. To add insult to injury, slingshots have been found with taunting phrases (like "Take that!") carved on them.

The ability to launch heavy projectiles developed relatively late in antiquity. Greek armies and ships made use of ballistae – machines that placed rope under heavy torsion to power their shooting. It was said that a single man could load and shoot a ballista. They were simple enough to be disassembled and reassembled as needed, yet powerful enough to take down armoured foes with shaft projectiles, and to be used as siege weapons with spherical ones. Greek vessels would use them to launch pots of flammable liquid – or in some cases poisonous snakes – onto other ships' decks. With further developments under the Romans, these weapons were able to shoot a dart over a kilometre.

MOBILE UNITS

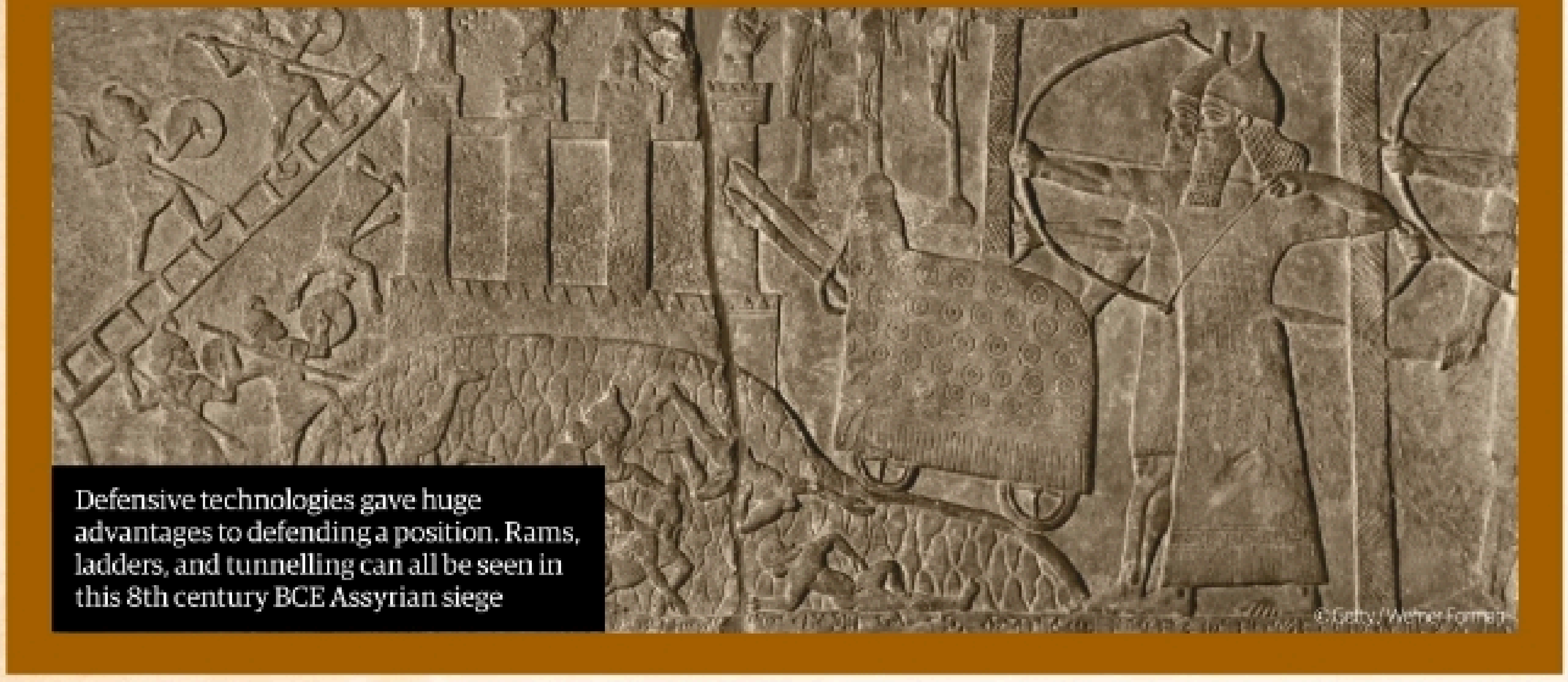
An army on the move is not a fast thing. Having to carry supplies for a campaign only further slowed down progress. Perhaps the earliest use of animals in warfare was to use them to carry materiel. Horses fulfilled the dual role of transport and use in battle. A mounted scout provided much-needed time to move an army by giving advanced warning of an approaching enemy. The saddle and stirrups were not invented until the very end of antiquity, making horses difficult and uncomfortable to ride. It is likely that the first chariots were developed from transport carts. These provided excellent positions for archers. Over time, chariots became swifter, lighter and more dangerous.

Horses were not the only animals to see use in warfare. In the Near and Middle East, archers used camel squadrons. In India, elephants were used from the 6th century BCE onwards, and their use spread westward. The sheer bulk of elephants shattered infantry and cavalry alike, and many archers could shoot from their backs. Hannibal's efforts to get elephants over the Alps in his attack on the Romans show how valued they were. The first elephants seen in Britain for thousands of years came with the invading force of the Roman emperor Claudius.

THE ART OF THE SIEGE

"Ascend and walk about on the wall of Uruk, inspect the corner-stone, and examine its brick-work, whether its wall is not made of burned brick…" The *Epic of Gilgamesh* describes the walls of the city of Uruk as one of Gilgamesh's greatest achievements. Written in ~2100 BCE, it shows how important defending cities and towns had become. One person up on a wall is able to keep many warriors below at bay. For many centuries the thick walls of cities was more than a match for any army outside.

Sieges began as simple exercises in holding an enemy captive in their own town and starving them out. This takes a lot of time, and requires the attacking army to put a lot of resources into the effort. The word 'siege' derives from the Latin 'sedere', meaning to sit. Our earliest records for sieges are the friezes from Egyptian tombs and Assyrian palaces. These show how the besieging army could speed the capitulation of a town. The simplest method of getting an army inside the walls was to climb over them. Egyptians used wheeled ladders propped against the walls. This left soldiers climbing them vulnerable from attack above. Assyrians developed complex battering rams to breach the walls. If all else failed, you could dig beneath the walls. Despite these developments a stout wall remained the best defence an army could have until the modern era.


Defensive technologies gave huge advantages to defending a position. Rams, ladders, and tunnelling can all be seen in this 8th century BCE Assyrian siege

© Getty / Werner Forman

> "The sand penetrated through the armour into the shirts, burned the body, and it could not be helped… they died, going mad with horrible pain"

DEFEND YOURSELF

In a battle, a shield can be your best friend, and in the ancient world many types of shield were developed and used by different armies at different times. These ranged from simple and light to complex and heavy. The Parthian empire had soldiers that used wicker shields. Lightweight, they were planted in the ground to provide a wall for archers to hide behind. The tower shield of the Mycenaean infantry was wicker covered in leather that protected the warrior. Later, Greek hoplites favoured a round wooden shield strengthened by metal. Their shields protected both themselves and the man to the left. To break the line and flee would not only endanger yourself, but the rest of your unit. In a lost battle a heavy shield could slow your retreat, and it was not unheard of for soldiers to fling them aside to better make their escape.

ANCIENT WAR TECHNOLOGIES TIMELINE

© Wiki / ChrisO

DEFINING MOMENT

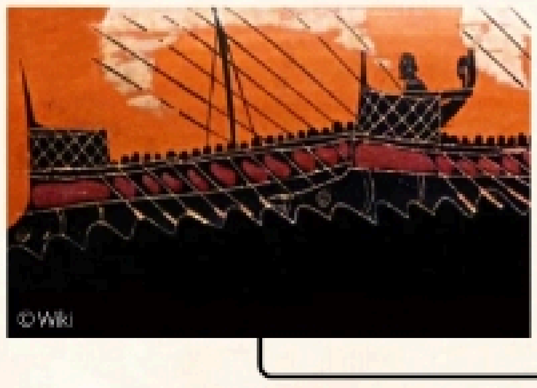
Composite bow
Pre-14th century BC

The simple – or self – bow consists of just a piece of wood under tension. By laminating layers of horn, wood, and sinew together, the bow can withstand more force and shoot arrows with more power at greater distances. The increased strength allows bows to be made much smaller than simple bows while maintaining the energy delivered to the arrow. A smaller bow is easier to carry into battle, but also gives soldiers mounted on chariots or horses the ability to shoot on the move. It's more complex weapon to build, but ferocious on the battlefield.

DEFINING MOMENT

Trireme 8th century BCE

The trireme was an oar-powered vessel with three banks of oars, capable of quick manoeuvres and with a ram on its front to sink other ships. Historians doubted the speeds that ancient writers claimed triremes could reach, but reconstructions have proved them to be accurate. The triremes of ancient Greece allowed some city states to dominate the sea. This allowed for the expansion of Greek colonisation around the Mediterranean. Later, heavier, ships bore even more oars, but the basic sleek design of the ships persisted throughout antiquity and supported the spread of the Roman Empire.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CHARIOTS

First appearing in Mesopotamia, the first chariots were pulled by onagers (wild asses). Slow and unwieldy but useful in supporting the infantry, they developed over centuries into deadly machines that dominated the field of battle.

~2500 BCE

GALLEY

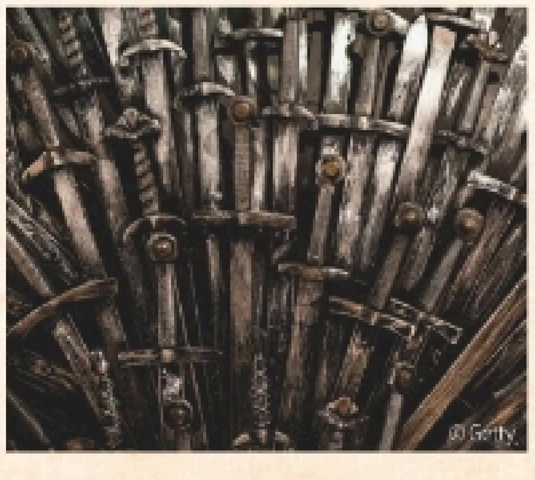
Earlier warships were used to ferry armies from place to place. From the 14th century BCE they developed into weapons themselves, and battles at sea began with crews boarding other vessels and archers on deck.

14TH CENTURY BCE

IRON WEAPONS

Use of iron to make steel weapons ended the Bronze Age, as bronze weapons were neither as strong or as sharp. Steel weapons and armour would dominate for thousands of years.

~1200 BCE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BATTERING RAM

Battering rams were logs slung from mobile wooden structures that were repeatedly pounded against walls and gates to bring them down. Wet hides hung from the sides protected the ram from being set ablaze.

9TH CENTURY BCE

© Getty / Leemage

Archery, infantry and cavalry technology were all created in the ancient world and dominated warfare until into the modern age

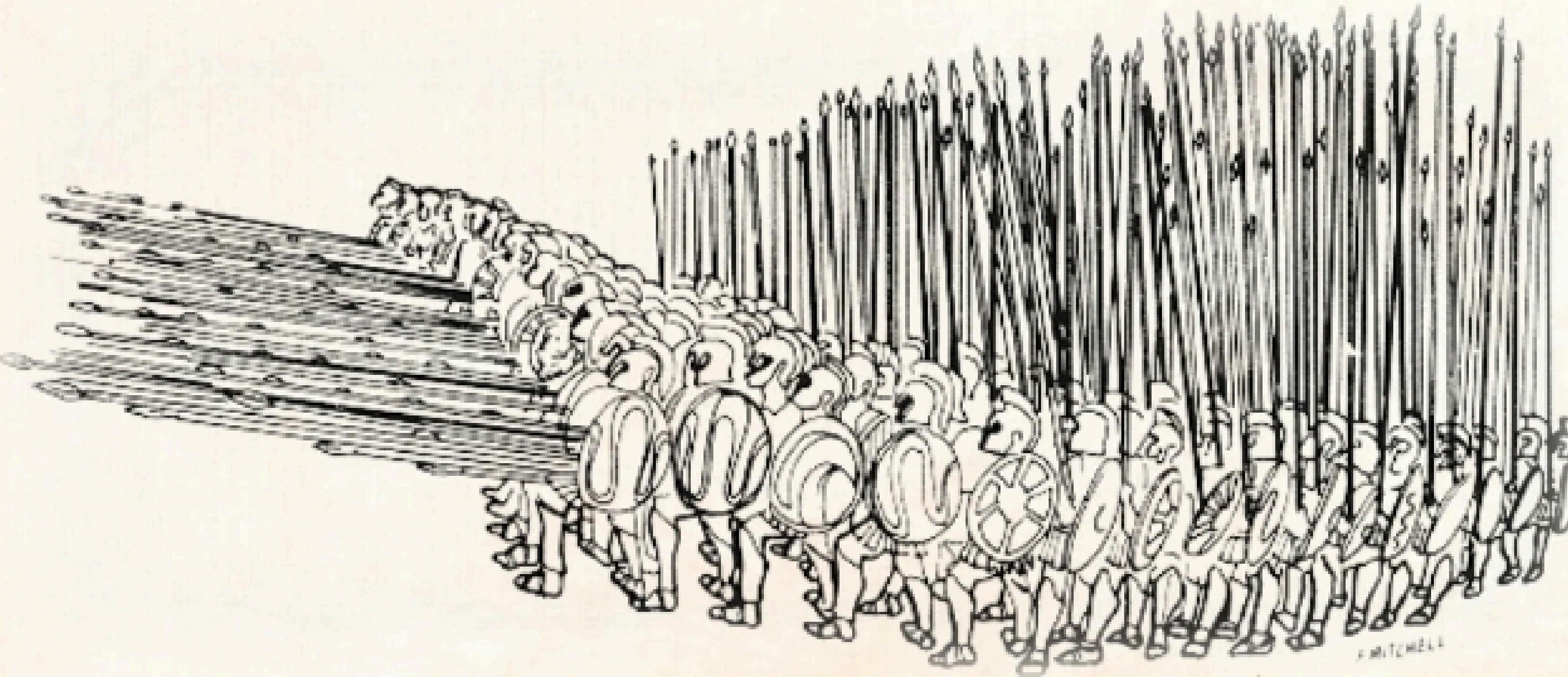
© Getty / De Agostini / G. Dagli Orti

Weaponry improvements drove the development of improved armour, as seen here in Macedonian troops carrying breastplates, shields, and helmets

For the Spartans this was the ultimate shame, and they were told to either "Come back with your shield, or carried dead upon it." While the shield is a necessary tool, it is not the best defence. It is much easier to survive a battle if you are not even on the field. Archaeology reveals that many towns and cities in the ancient world built strong walls to keep out their enemies. Safe behind a wall, you could pour down arrows on the army milling about beneath you. Even if the enemy came with ladders to scale your walls, you could easily topple them or get more creative – when Alexander attacked Tyre, the defenders heated sand to red-hot and tipped it on the besiegers, as 1st century CE Greek historian Diodorus Siculus grimly recorded: "The sand penetrated through the armour into the shirts, burned the body, and it could not be helped… they died, going mad with horrible pain, in sufferings piteous and unquenchable."

Shields, armour and walls were not the only ways of winning a battle. Deception and fear could be a potent tool in the arsenal. At the battle of Pelusium, the Persian side painted images of the Egyptian gods on their shields and marched with holy animals – cats, sacred to the Egyptian goddess Bastet – in front of them. The Egyptian soldiers were so scared of offending their gods that they fled, losing the battle.

To confuse his opponents, Hannibal once unleashed thousands of oxen at night with burning wood tied to their horns. The spectacle of what seemed to be a whole army on the move paralysed the Roman force. When the cattle struck the Roman lines their panic scattered the soldiers. Ancient fighters may have lacked modern technology, but they had cunning.



© Wiki / F. Mitchell, Department of History, United States Military Academy

DEFINING MOMENT

Sarissa ~358 BCE

King Philip II of Macedon inherited a fractious kingdom and weak army. He transformed his forces through the introduction of the sarissa – a spear up to 6m long made of tough wood. Armed with these long weapons the Macedonian phalanx was able to create a bristling wall of vicious spear tips to attack their enemy with. With this new formation and tactic, Philip was able to impose his leadership on Greece in a number of decisive battles. His son Alexander the Great would conquer a vast empire using this technique as well.

CROSSBOW (CHINESE)
The crossbow offered greater power for its size and better accuracy because it did not require the archer to draw and aim at the same time. The drawback is that crossbows are slower to draw back.
7TH CENTURY BCE

WAR ELEPHANT
Few infantry units or cavalry charges could hold in the face of onslaught by elephants. If an elephant panicked, though, it could be equally destructive to its own side.
6TH CENTURY BCE

BALLISTA
Using twisted ropes allowed the ballista to launch projectiles with a great deal of force. In a siege they could shoot over high walls or even be used to attack walls themselves. Pots of oil could spread fire into a town.
~400 BCE

GLADIUS
The Roman short sword was used more for stabbing than slashing. This allowed Rome to develop the lock-step legions of soldiers standing closely packed with which they conquered their large empire.
3RD CENTURY BCE

SADDLE AND STIRRUPS
The earliest saddles were simply blankets thrown over a horse's back. With the development of solid saddles, stirrups were invented in China. Stirrups gave riders greater security and paved the way for the cavalry of the Middle Ages.
3RD CENTURY CE

WELSH GOLD: THE BURTON HOARD

While many elaborate gold items exist from Bronze Age Wales, this hoard is considered an important find containing spectacular jewellery

Written by **Dee Dee Chainey**

©Wiki/ Mark Ramsay

In 2004 two metal-detectorists uncovered a collection of objects when walking the recently ploughed fields of Burton, Wrexham, in north-eastern Wales. Said to contain items unparalleled in Britain, the artefacts are thought to date to the middle Bronze Age, around 1300-1150 BCE.

The Burton Hoard itself is comprised of bronze tools and gold jewellery. While most of the items were hidden inside a ceramic pot, a chisel and two hatchets were buried alongside. It is debated whether these items belonged to a rich family or an individual, or might be gathered together as part of trading activities. Some suggest the careful burial indicate that it might represent a ritual offering, or dedication to a dead loved one, yet buried separately from their body. The two palstaves show extensive wear, possibly revealing that they had been used, unlike many items that appear as ritual offerings, suggesting that they might have been hidden for safe keeping.

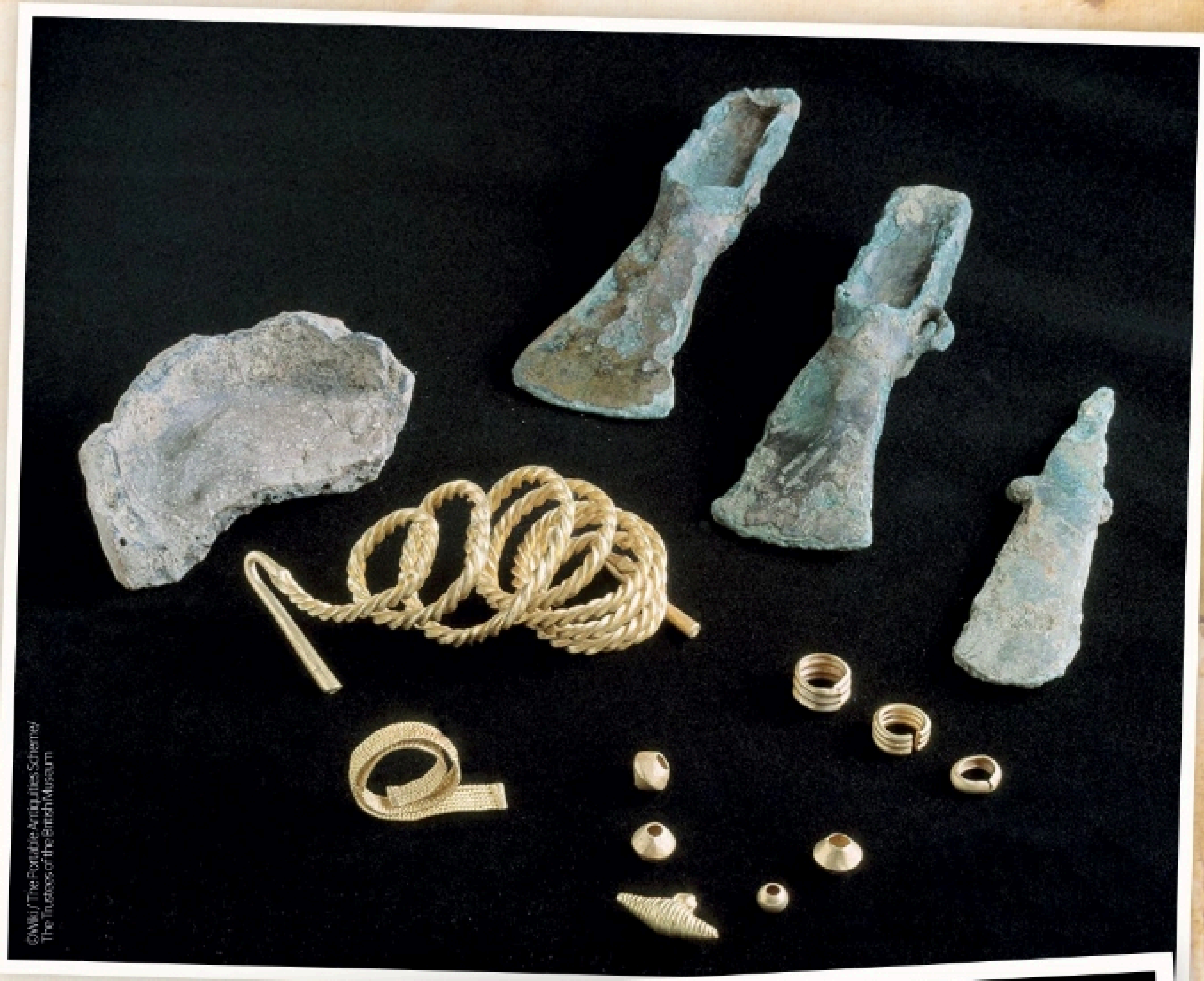
A number of the items in the hoard were made from gold: a folded torc, three rings for the fingers, and four beads thought to be hammered from thin gold sheets. An intricately made bracelet – as well as a pendant for a necklace with a biconical bead – were made by twisting gold into ornate spirals in a technique unknown outside of north-western France before this, suggesting a link with the Continent. Torcs were made using this technique across the Continent, commonly worn on the neck or upper arm. The bead is believed to be hollow, and thought to be part of a strung bead necklace, probably as the centrepiece.

While this hoard is not the most famous of the period or region, it is one of a group that underpin the important role Wales played in Bronze Age metalworking. The Rossett Hoard, found a few miles away from the Burton Hoard, contained part of a bracelet made from gold hailing from Ireland, an axe and dagger. The Acton Hoard is another Wrexham collection of palstaves, or axe heads, that show great skill and craftsmanship. With such exquisite metal artefacts found throughout the area, this region is thought to have been a metalworking hub during the Bronze Age paralleling East Anglia and Kent, and an important communication and trade route through from Ireland. Alongside these examples, many other gold items from the Welsh Bronze Age have gained international renown, and include some of the finest items in existence, like the Mold Cape.

LEFT: The Mold Cape was discovered under four miles away from the Burton Hoard, in 1833, another example of astonishing Welsh gold work from the Bronze Age

ABOVE RIGHT: Reports say that the Burton Hoard finds had been disturbed by recent ploughing, yet no other items were discovered during further investigations in the field

BELOW RIGHT: This twisted gold wire bracelet was formed from six twisted wires, possibly with soldered joins in between. It's believed to have been tightly wound to fit into the pot



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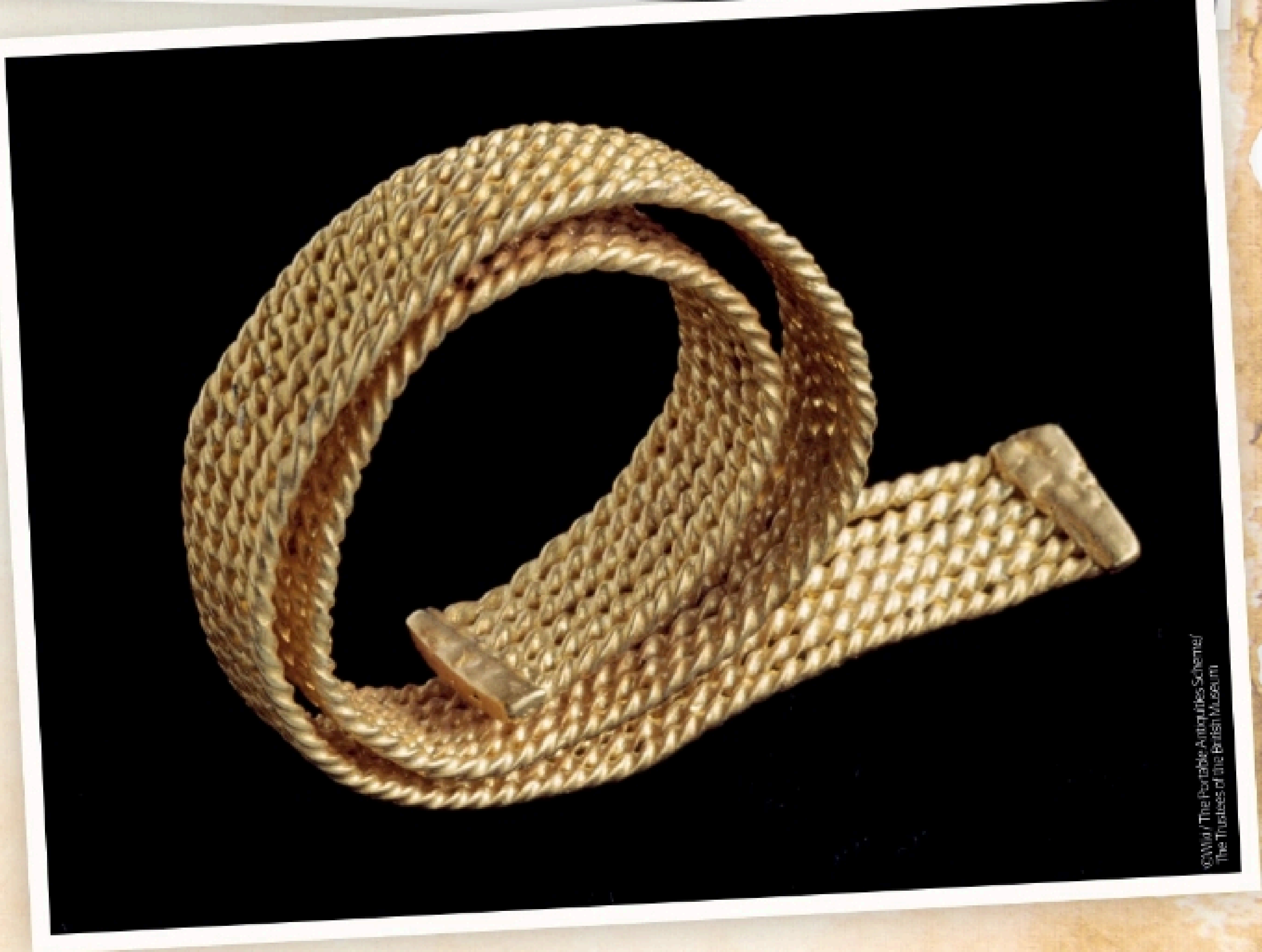

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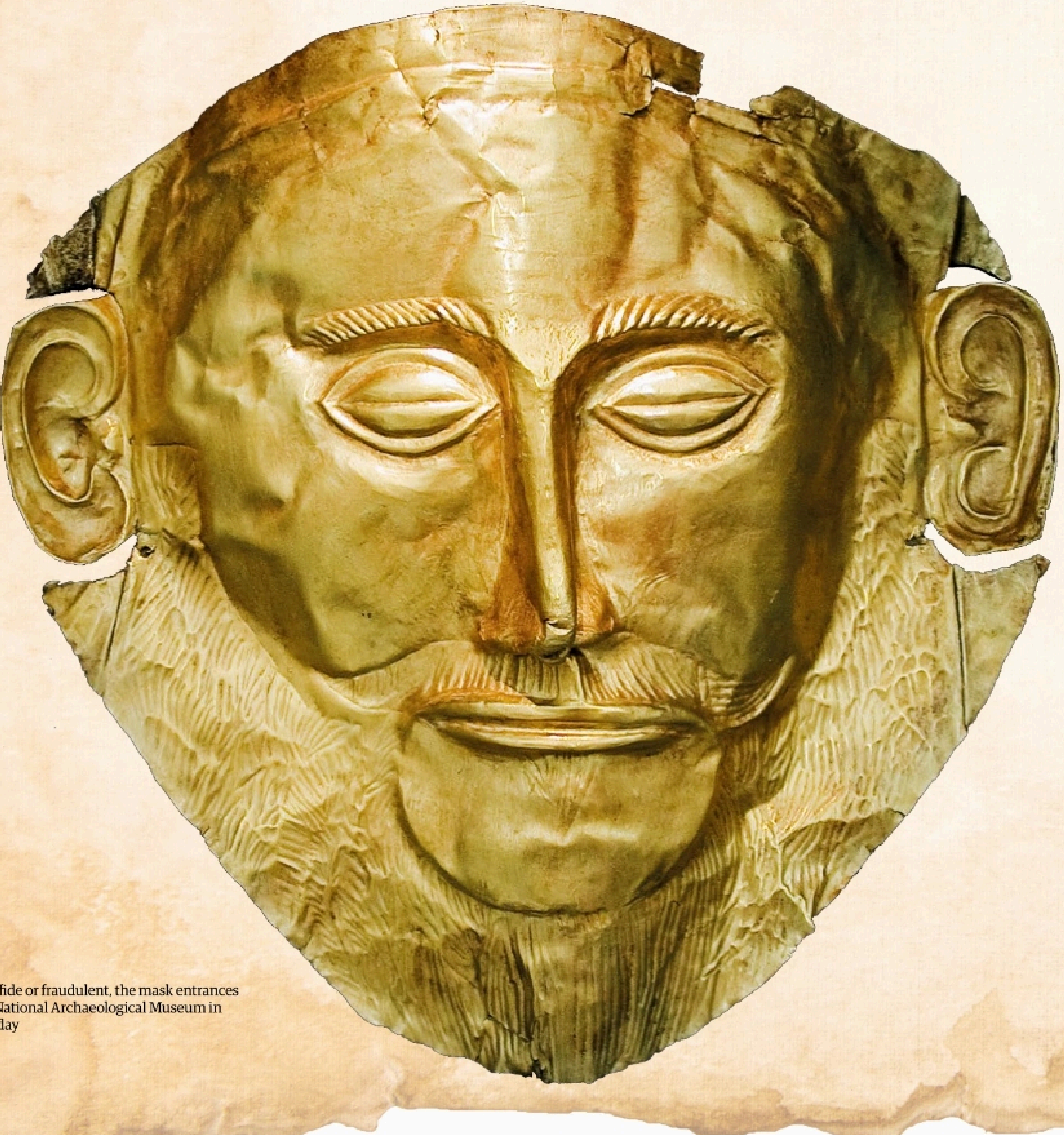
"It is debated whether these items belonged to a rich family, an individual, or might be gathered together as part of trade"

THE MASK OF AGAMEMNON

This glorious death-mask is shrouded in mystery, steeped in controversy, and has confounded experts for over a century. But what is the truth behind its origins?

Written by **Dee Dee Chainey**



Whether bona fide or fraudulent, the mask entrances visitors to the National Archaeological Museum in Athens to this day

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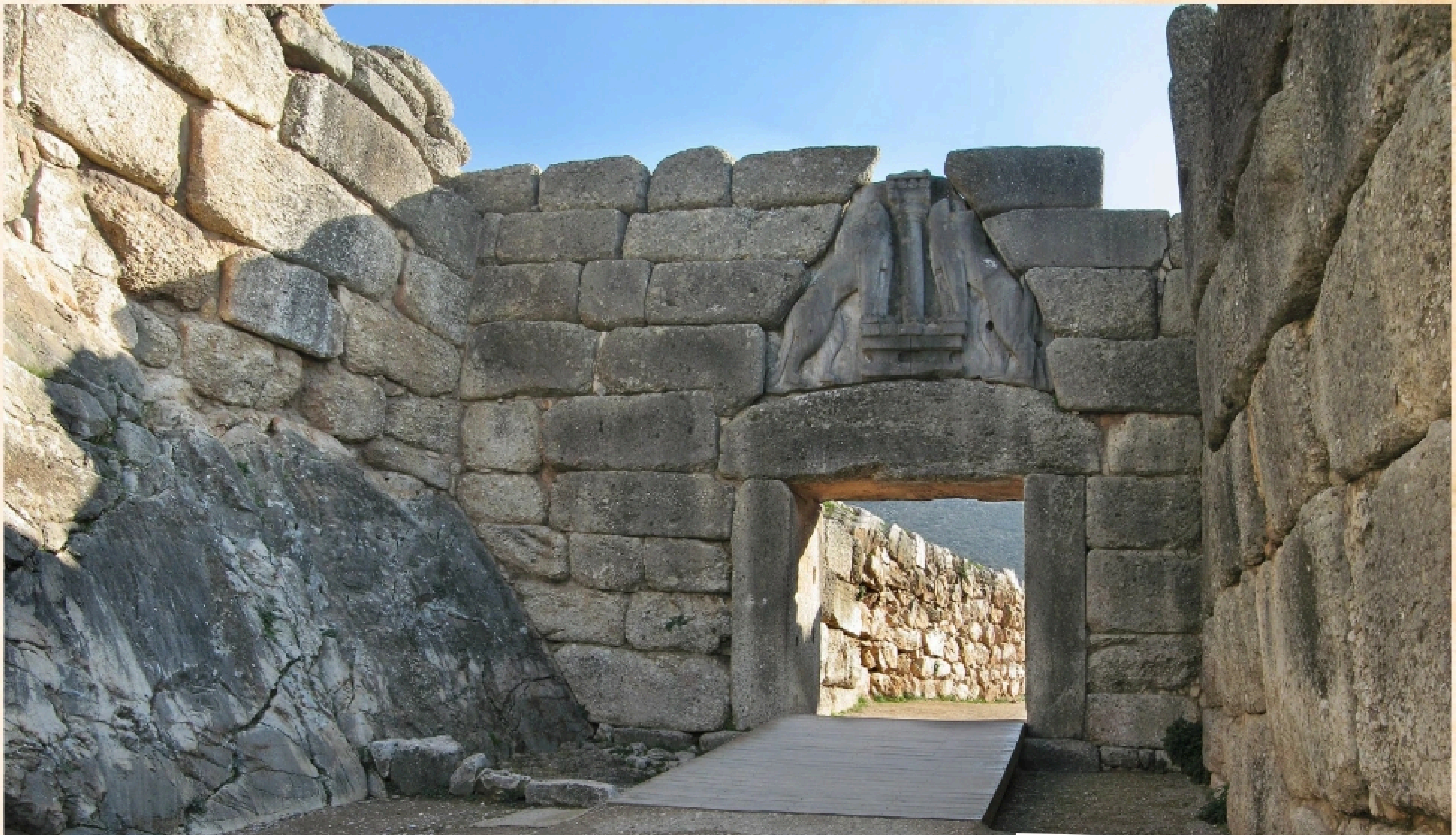


Mycenae was identified by Francesco Grimani in 1700 from Pausanias' descriptions of the infamous Lion Gate. The location lay 75 miles south-west of Athens

©Wiki / Andreas Trepte

"Theories have been proposed that the artefact might be a forgery, with Schliemann commissioning it himself"

The Mycenaean civilization was a late Bronze Age culture that flourished from around 1600–1100 BCE, and one that many cite as being the first advanced culture in Greek history, with exploits from this period detailed in classic works from *The Trojan Epic Cycle* giving us a great insight into life in this period.

With such an illustrious history laid out before him, it's unsurprising that the archaeologist Heinrich Schliemann set out on his own quest to uncover the secrets of Troy. Digging across the region, he began excavating Mycenae in 1876. He soon uncovered a miraculous object: a gold death-mask. Found in shaft grave V from grave circle A at the site, the mask was the only one of five unearthed from the shaft graves that depicted a man's face. Hammered from a single sheet of gold, the mask covered the face of a male body that was accompanied by high status grave goods, leading Schliemann to identify the figure as King Agamemnon himself, the leader of the Mycenaeans, whose exploits were detailed by Homer in *The Iliad*.

The mask was made through a process of heating the gold, then hammering it out over a wooden frame. Holes were made on the sides to enable the mask to be tied to the wearer's head with string or twine. This is the most decorative of all the masks found, with a beard, moustache and eyebrows all finely chiselled into the surface with a sharp tool after it was formed.

The true origin of the mask, however, remains controversial, and experts began to question its authenticity over 70 years ago. Theories have been proposed that the artefact might be a forgery, with Schliemann actually commissioning it himself. This is based on the fact that three masks were found days before the Mask of Agamemnon, a period when excavators were rained off the site. Many argue he would have had ample opportunity to commission and place the mask, which differs in design and technique from the others. While Schliemann's words to King George of Greece still echo down the years, "I have gazed upon the face of Agamemnon", his dream remains unrealised, since experts now date the mask to around 300-400 years before the Trojan War occurred, since similar techniques were used in this period.

ABOVE: Schliemann died on Boxing Day, 1890. He was buried in the First Cemetery of Athens; the frieze of his tomb depicts his excavations at Mycenae, amongst other sites

GRAVE OF THE GRIFFIN WARRIOR

The discovery of the treasure-filled grave of a warrior buried in Greece 3,500 years ago continues to astonish archaeologists

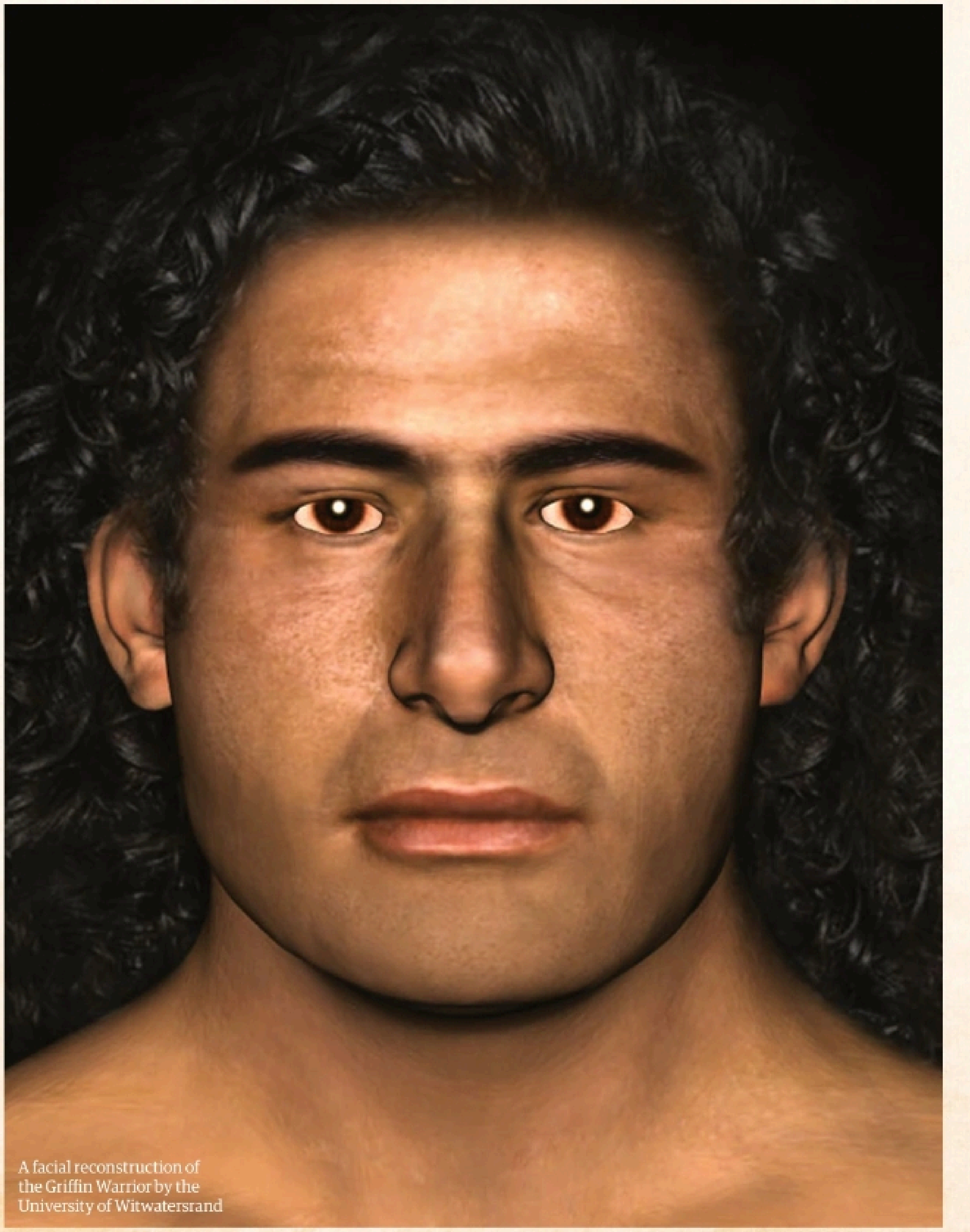
Written by Rebecca Ford

It is the stuff that archaeological dreams are made of – a dig that uncovered the intact grave of a Mycenaean warrior who was buried around 1500 BCE, his tomb filled with an extraordinary range of treasures including silver cups, a sword, golden rings, precious stones and even a bronze mirror. Not only that, but the discovery is considered to be of such immense historical significance – with the potential to deepen and inform our whole understanding of the ancient world – that it has been hailed by the Greek Ministry of Culture as the "…most important tomb to have been discovered in 65 years in continental Greece." The grave is situated in a field near the famed Palace of Nestor at ancient Pylos – which is near the modern day town of Chora in Messinia – however, it predates the palace by several hundred years.

The earliest advanced civilisation in Europe is said to date back to around 2600 BCE with the Minoans of the island of Crete. Named after the mythical King Minos, they developed Linear A – an early script, traded widely across the Mediterranean and Aegean – and were skilled artists, metalworkers and makers of ceramics. They are widely portrayed as gentle merchants and agriculturalists who revered female deities and built sophisticated cities with stone roads, sewage systems and grand palaces. The largest known Minoan site is the palace of Knossos, on Crete. However, by around 1450 BCE, their influence seems to have given way to that of the Mycenaean culture of the mainland – perhaps, many scholars think, after the Mycenaeans invaded, conquered, and burned the palace.

The name Mycenaean derives from the fortified palace of Mycenae in the Peloponnese, which was excavated in the 1870s by German archaeologist Heinrich Schliemann, a pioneer who also uncovered Troy. Uncovering a wealth of artefacts including weapons, pottery and treasures made of silver and gold, he identified Mycenae as the palace of King Agamemnon, who was celebrated as the leader of the Greek forces in the Trojan War.

The discoveries attested to the wealth and prosperity of Mycenae, which Homer had referred



A facial reconstruction of the Griffin Warrior by the University of Witwatersrand

Excavations at the site have continued to yield fascinating objects since the first discovery

"Most important tomb to have been discovered in continental Greece"

to as "rich in gold". Schliemann also uncovered a number of shaft graves - deep rectangular tombs that have traditionally been viewed as typical of early Mycenaean practice, later superseded by their characteristic beehive tombs. Schliemann, as previously noted, is a controversial figure though.

The Mycenaeans built other strongholds across the Greek mainland at Tiryns, Thebes and Athens as well as at Pylos. Their culture, which has traditionally been portrayed as more warlike, male dominated and less artistically sophisticated than that of the Minoans (one academic once described them as "barbarians" in comparison with the Cretans), spread from the Peloponnese across the eastern Mediterranean.

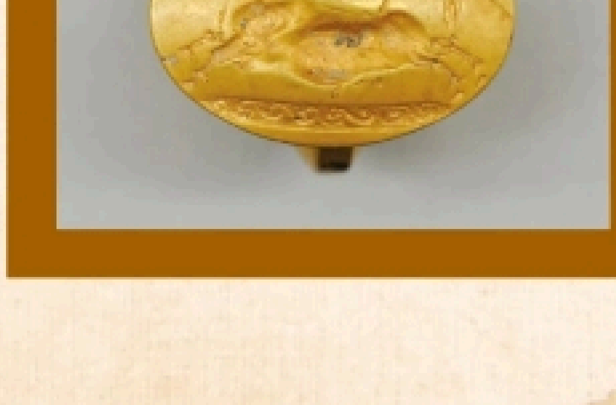
They traded extensively - probably in commodities such as oil and wine, as well as ceramics - and appear to have been skilled engineers, building bridges, fortifications and both drainage and irrigation systems. Their civilisation flourished until around 1100 BCE when it rapidly declined - perhaps, most scholars think, due to waves of invasion during which Mycenaean sites were destroyed and plundered. However, it was Mycenaean culture that provided the roots of classical Greece, the civilisation immortalised by Homer in the *Iliad* and the *Odyssey*.

THE KEY FINDS

Unlike most Mycenaean graves, there were no ceramics, but glittering gems, carved stones and weaponry instead

THE RINGS

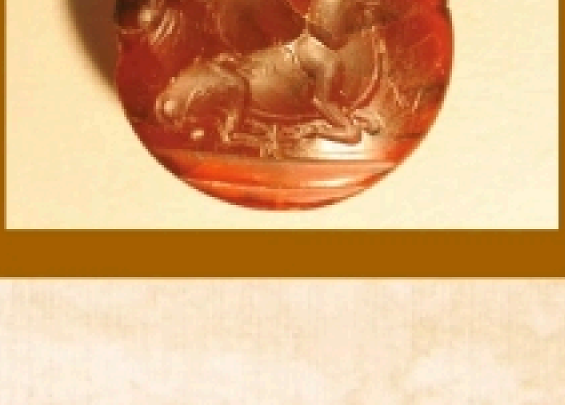
Four rings were found, made of layers of gold and etched with scenes depicting typically Minoan motifs. One shows a leaping bull, another depicts a woman offering a bull's horn to a goddess who is seated on a throne and holding a mirror. Then there are five finely-dressed women at a seaside shrine, while the fourth shows a woman holding a staff with two birds on either side. The Cretan artistry provided excellent evidence for cultural exchange.



SEAL STONES

Archaeologists discovered more than 50 seal stones (a sort of amulet) in the grave around the warrior's skeleton. These seal stones were adorned with Minoan-style carvings that were depicting various things such as goddesses, lions, bulls, reeds and altars. It is thought that they were originally made in Crete.

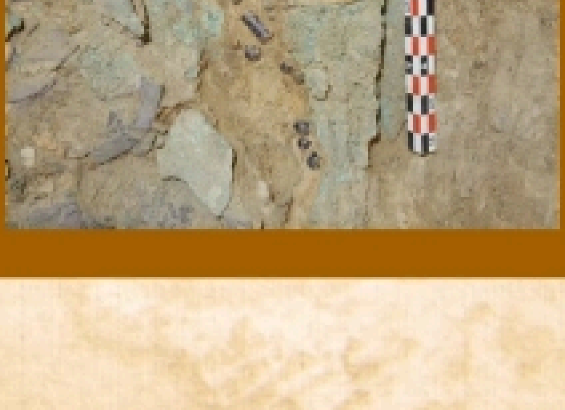
The sheer number of stones alone is highly unusual in a grave of this type and attests to the high social status of the Griffin Warrior.



SWORD & DAGGER

The grave contained a number of different weapons including a stunning 91-centimetre-long sword with a hilt that is made of ivory and gold. It was on the left side of the grave, by the man's chest.

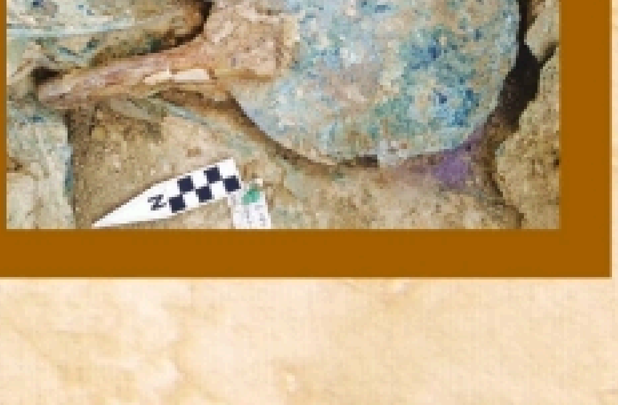
Beneath it was a dagger with a hilt, intricately decorated with gold. The positioning of these items within the grave must have been of some symbolic importance, perhaps reflecting his skill as a fighter or his political or social power.



THE MIRROR

The presence of a traditionally feminine item such as the bronze mirror is highly unusual in a male grave - at least in the sites that have been excavated to date.

The bronze mirror has an ivory handle and was placed above the Griffin Warrior's legs - this position may be suggesting that the mirror might hold some special significance. There could be some kind of allusion to the second of the golden rings in which a goddess holds a mirror.



Although the Mycenaeans might appear to be very different peoples to the Minoans, there was a degree of cultural interchange – though to what extent is unclear. It is an issue that scholars have long debated. "We have known for a century that people on the mainland started importing objects from Minoan Crete," said Professor John Bennet, director of the British School at Athens and professor of Aegean archaeology at the University of Sheffield.

Conclusive evidence for Minoan influence on Mycenaean culture came when Carl Blegen of the University of Cincinnati discovered King Nestor's Palace, ancient Pylos, in 1939. The clay tablets he found, on which Linear B script were inscribed, proved similar to ones found in Knossos, demonstrating a strong cultural link.

In Linear B script, each symbol stands for a syllable. It formed the basis for the Greek alphabet, where a symbol represents a vowel or consonant. Now, the discovery of the Griffin Warrior's tomb may shed new light on this aspect of the ancient world.

The tomb was discovered in May 2015 by Jack L Davis, professor of Greek archaeology at the University of Cincinnati, and Sharon Stocker, his wife and fellow archaeologist, who represents the University of Cincinnati in excavations at the Palace of Nestor.

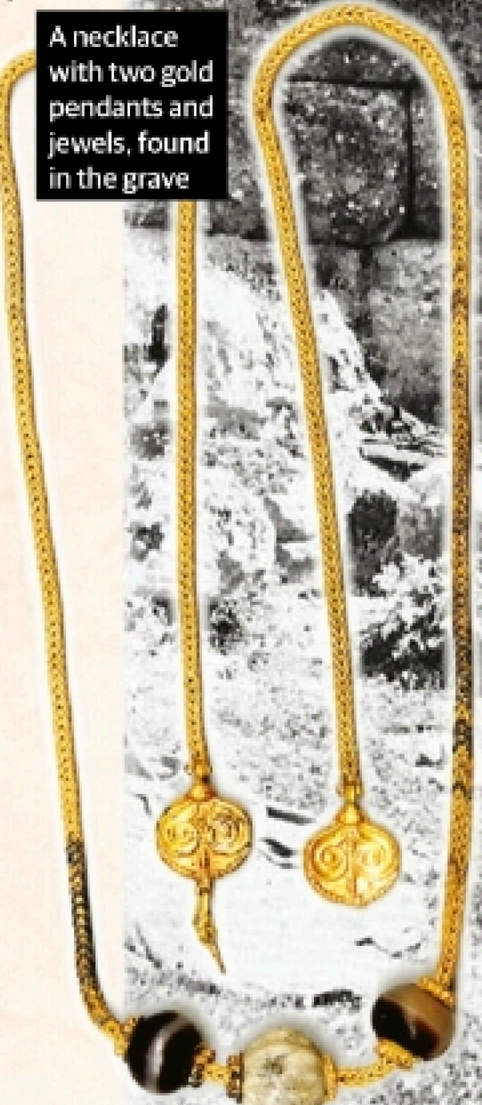
They assembled an international team of experts, with the initial intention of searching a field near the palace for evidence of settlement, perhaps domestic dwellings.

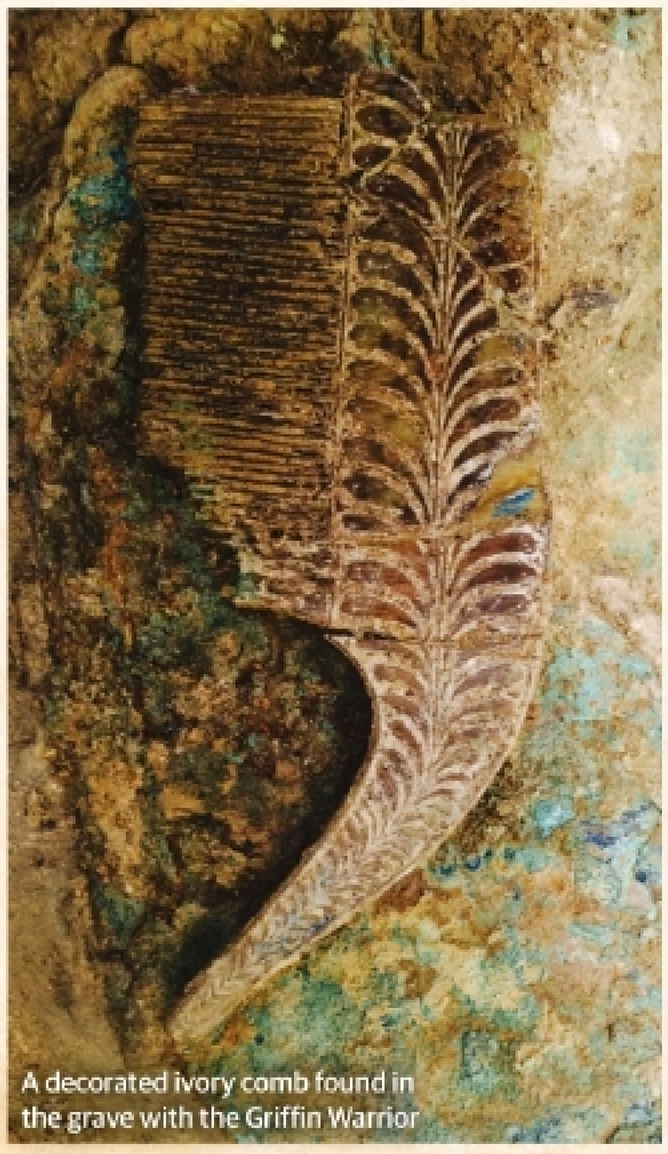
They began to dig where some stones were sticking out of the ground and soon realised that they had not uncovered a house, but unexpectedly a grave. Work commenced in earnest and it was not long before Davis and Stocker received a text: "Better come. Hit bronze."

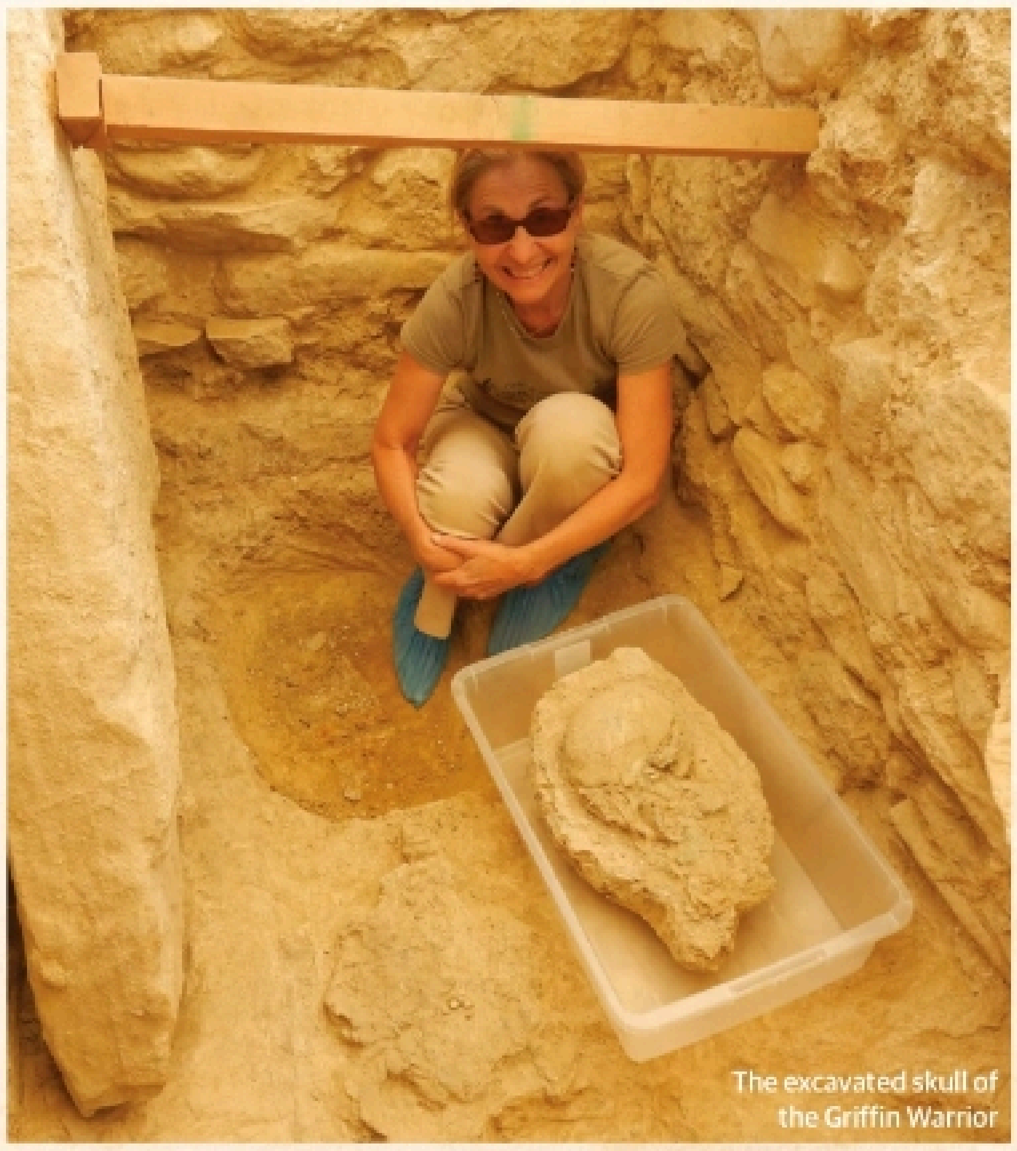
The bronze artefacts discovered were just the start. The shaft grave – around 1.5 metres deep, 1.2 metres wide and 2.4 metres long – contained the well-preserved skeleton of a man in his early 30s. The warrior was lying on his back and had been buried in a wooden coffin, which had long decayed, but the grave was otherwise undamaged. The astonished archaeologists soon realised the grave also held a dazzling treasure trove, for the skeleton was surrounded by an extraordinary array of artefacts: weapons to his left and at his feet, jewellery to his right. Pitchers and other items that had originally rested above the body were on his chest.

The researchers dated the burial to around 1500 BCE, several hundred years before Nestor's palace was built and in the early years of Mycenaean civilisation. Among the weapons was a large bronze sword, with a gold and ivory hilt, and a golden-hilted dagger.

There were cups and pitchers – unusually these were all made of gold, silver and bronze (no mere ceramics for him), delicately etched seal stones (a sort of amulet) and jewels that included a golden chain and pendant, and four gold signet rings.

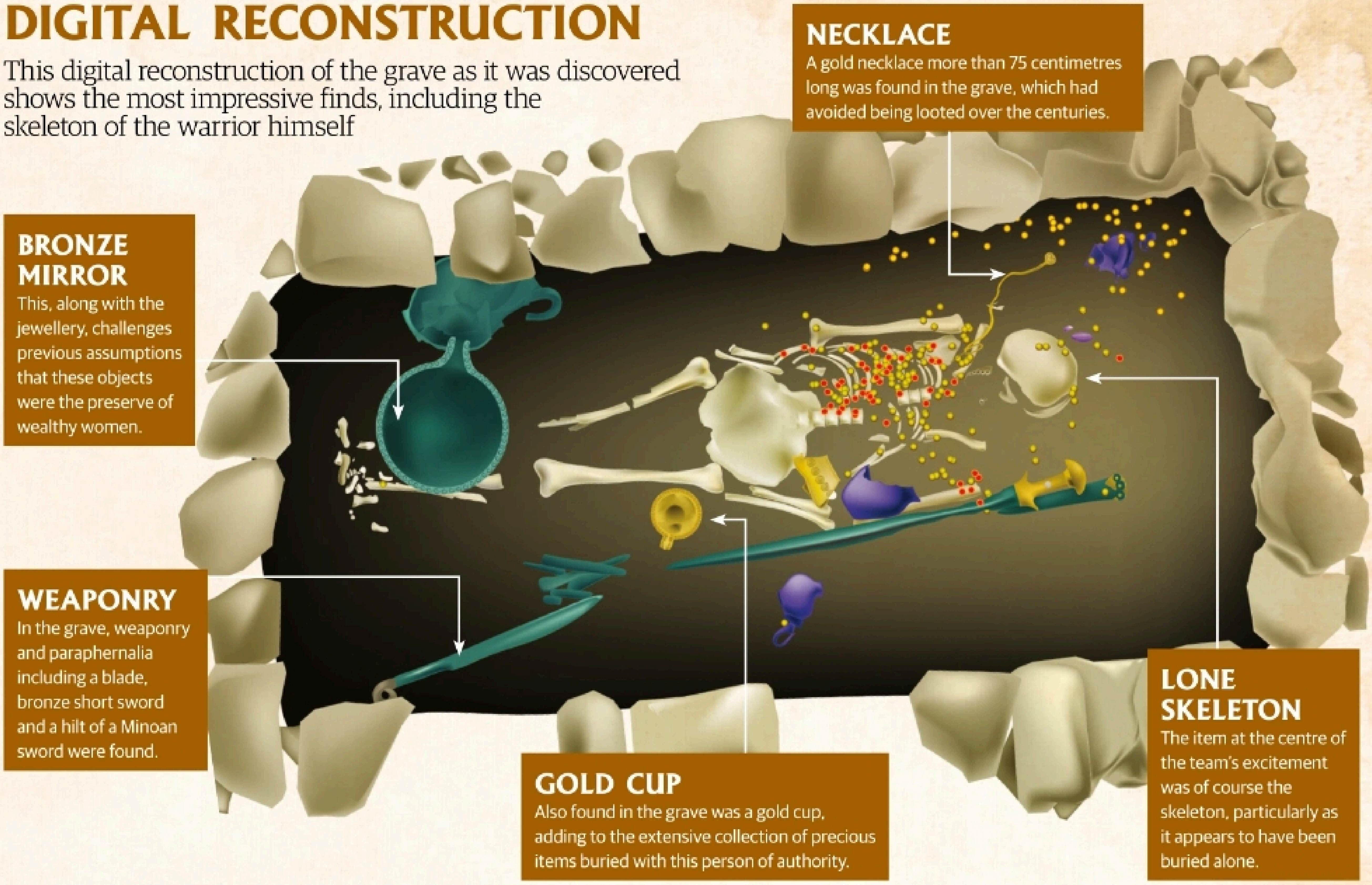

A necklace with two gold pendants and jewels, found in the grave


A decorated ivory comb found in the grave with the Griffin Warrior


The excavated skull of the Griffin Warrior

DIGITAL RECONSTRUCTION

This digital reconstruction of the grave as it was discovered shows the most impressive finds, including the skeleton of the warrior himself



NECKLACE
A gold necklace more than 75 centimetres long was found in the grave, which had avoided being looted over the centuries.

BRONZE MIRROR
This, along with the jewellery, challenges previous assumptions that these objects were the preserve of wealthy women.

WEAPONRY
In the grave, weaponry and paraphernalia including a blade, bronze short sword and a hilt of a Minoan sword were found.

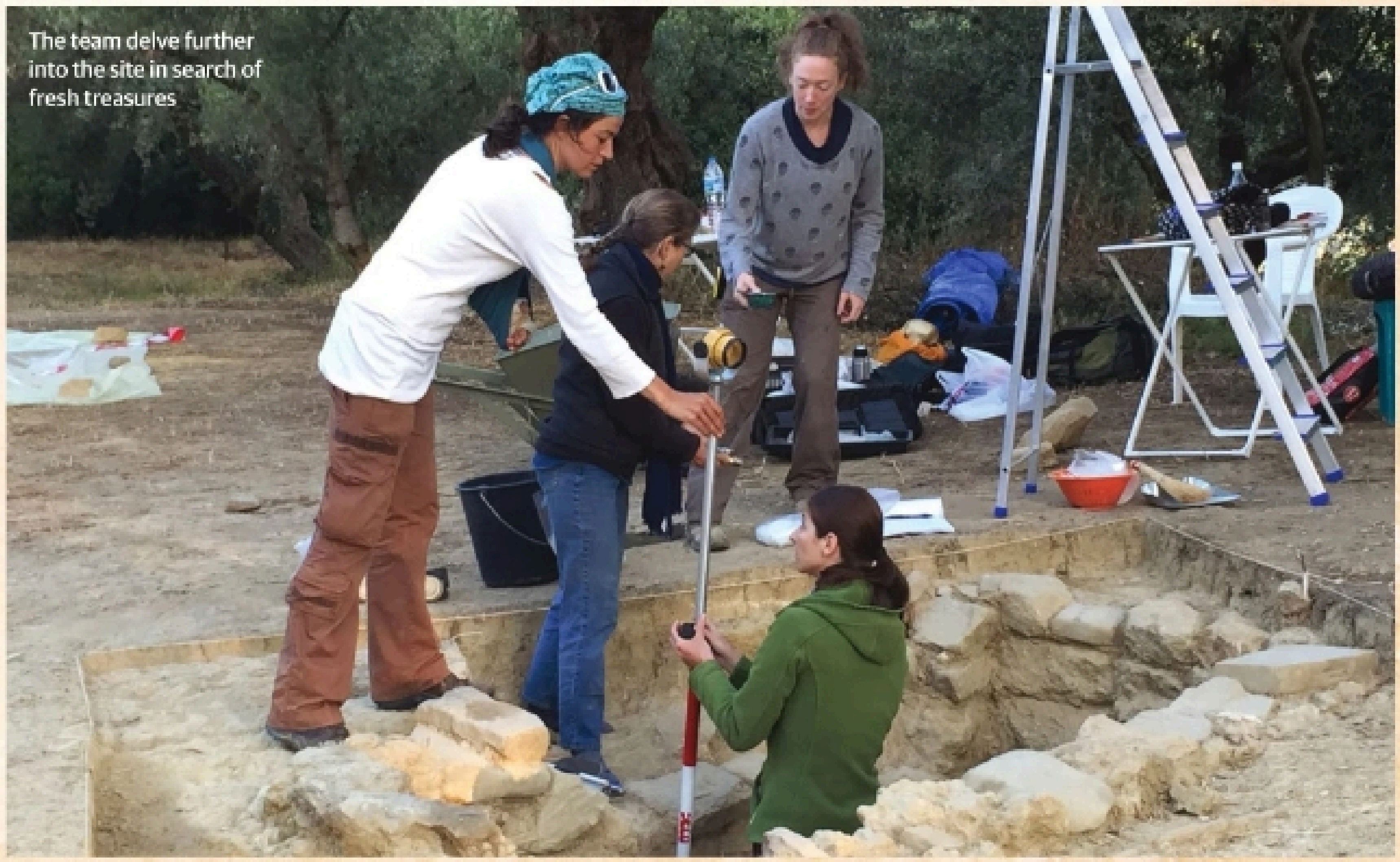
GOLD CUP
Also found in the grave was a gold cup, adding to the extensive collection of precious items buried with this person of authority.

LONE SKELETON
The item at the centre of the team's excitement was of course the skeleton, particularly as it appears to have been buried alone.

Thousands of beads made from materials such as amethyst, amber, carnelian, jasper and gold lay beside him, many drilled with holes suggesting that they would once have been strung together to form necklaces. Perhaps to ensure that the warrior looked his best for his passage to the next world, the grave also contained a bronze mirror with an ivory handle and six ivory combs.

The final touch – which gave the man his nickname – was an ivory plaque embellished with the image of a griffin, which lay between his legs. The griffin, a mythological beast with a lion's body and eagle's head, was associated with power. Most Mycenaean graves appear to contain more than one body. "It's extremely unusual to find an undisturbed tomb of a single burial," explained Professor Bennet, who added, "We have also all been astonished by just how many objects it contained." What makes the findings particularly significant is that although buried on the mainland, the vast majority of them appear to have come from Minoan Crete – or at least have been made in Minoan style. They therefore provide evidence for extensive cultural interchange and a strong Minoan influence on early Mycenaean society.

Did the Griffin Warrior himself come from Crete? Was he a Mycenaean who had looted goods from the island or had he had them custom-made locally in Minoan style? Had the items been imported by traders, supplying mainland markets with desirable Minoan goods? As yet, no one can be sure. While the presence of martial items, such as the sword, suggests he was a warrior, the vast amount of jewellery confuses the picture, as it was commonly believed that such trinkets were only buried with wealthy women. One explanation could be that the jewels were offerings to a deity.



The team delve further into the site in search of fresh treasures

Then there are the many seal stones, small gems used as amulets, which might suggest he was a religious leader, or that he or those who buried him had deeply entrenced religious beliefs. He was however, certainly wealthy, and certainly very important.

The extent to which the grave goods exhibit Minoan imagery, and showcase Minoan art, is fascinating. "The four rings bear scenes of such distinctively Minoan iconography that we might well have questioned their authenticity had they not been found in an intact grave," said Professor Bennet. One ring, for instance, shows a leaping bull – a motif commonly associated with Minoan culture and one that gave rise to the legend of the Minotaur. Then we come to the seal stones, which are intricately decorated with typically Minoan scenes – goddesses, lions, bulls and men indulging in their favourite Minoan sport of leaping over a bull's horns.

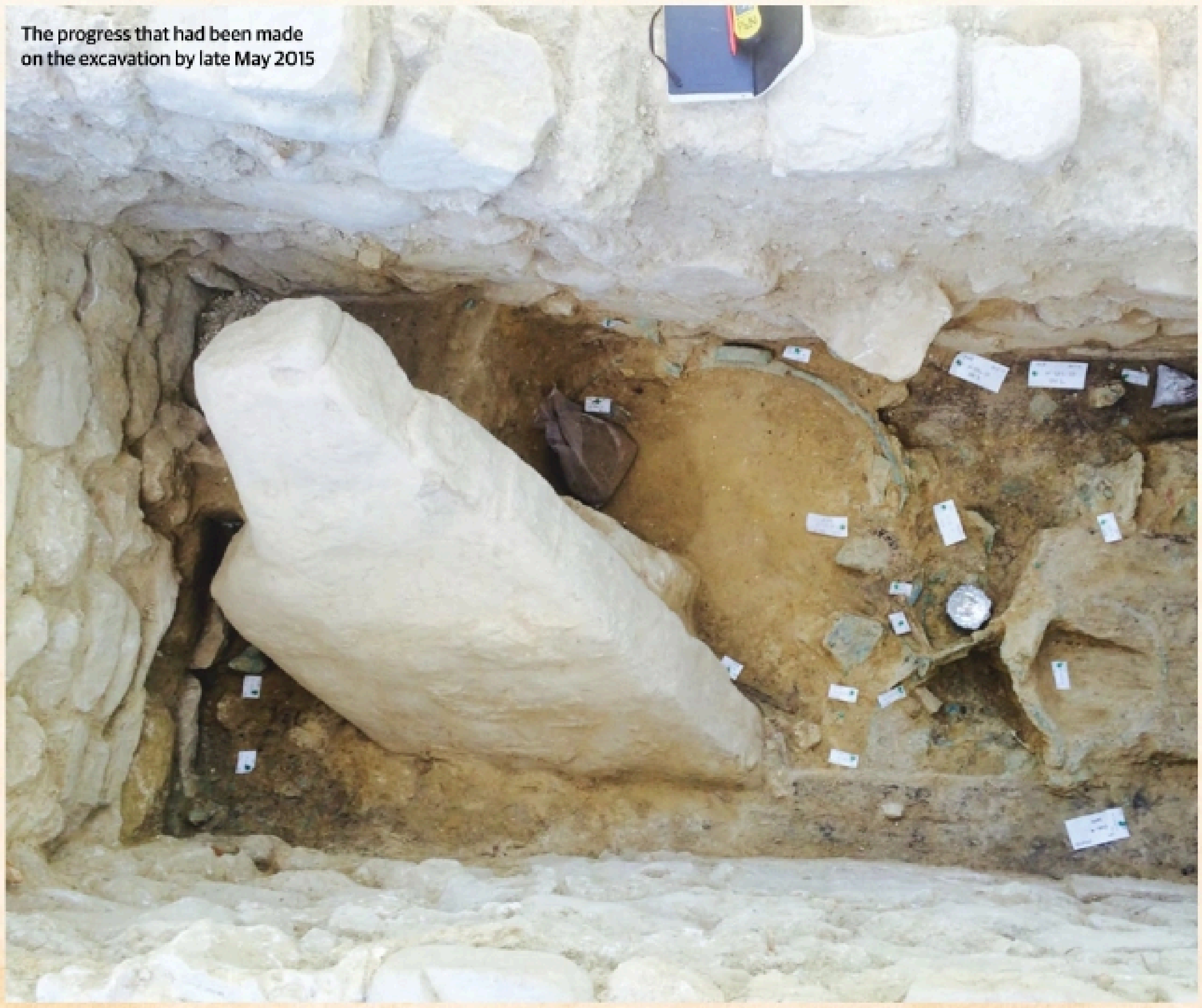
> "We might well have questioned their authenticity had they not been found in an intact grave"

Although we know little about him, we do have some idea of the appearance of this 3,500-year-old man, as specialists at the University of Witwatersrand have performed a facial reconstruction, revealing the warrior was dark and handsome with strong features and a powerful neck. Researchers will soon carry out DNA analysis on the skeleton of this mysterious man. His teeth are in good condition and so they may yield information about his genetic background, while tests should also provide an insight into his diet and help to determine the cause of death. If plant material is found, it might be able to be used to provide a radiocarbon date for the burial. The grave has now been sealed over and the artefacts taken away for careful scientific analysis.

As Professor Bennet explains, though, the grave is not just significant for its contents but also for the very nature of the tomb itself.

It has traditionally been thought that the early Mycenaeans buried their dead in shaft graves but that the practice was later superseded by the use of beehive tombs.

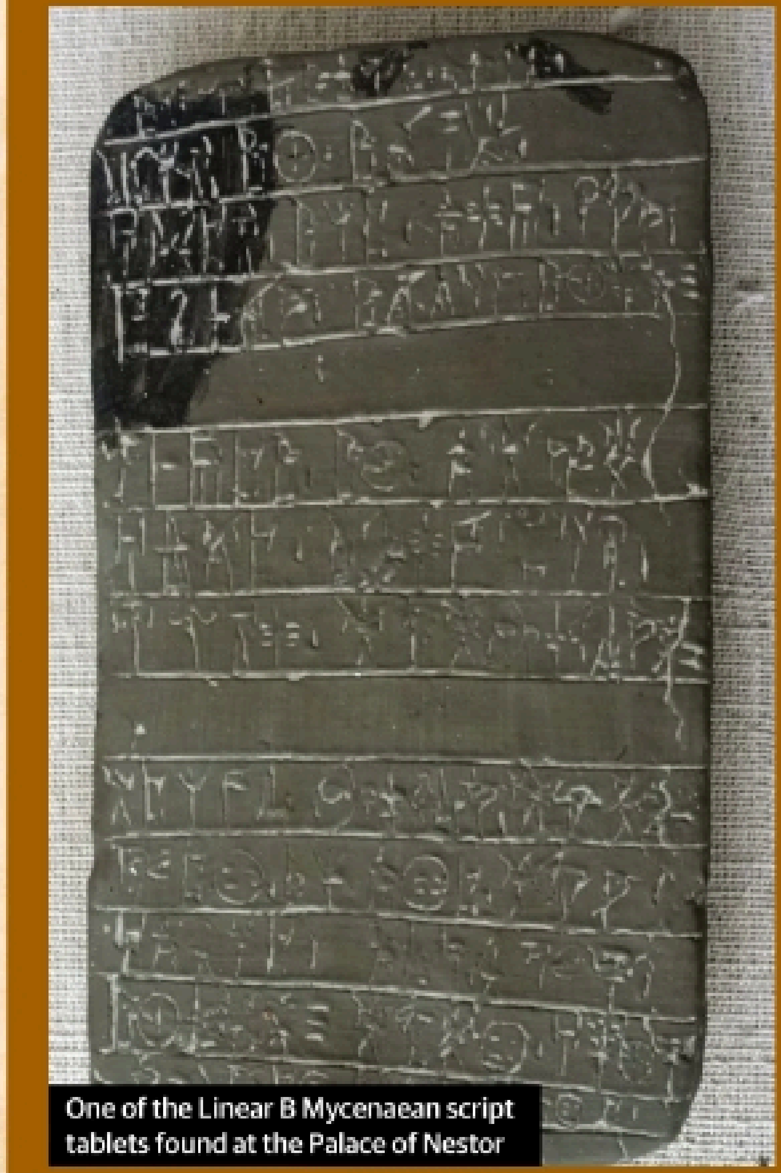
However the Griffin Warrior is buried in a shaft grave not far from a beehive tomb that was excavated by Carl Blegen in the 1950s – and that beehive tomb was built some time before the Griffin Warrior was laid to rest. It seems that this discovery will cause scholars to question much of what is known about this period in Greek history. It will also likely pique public interest in the identity of the swarthy stranger from another age; a man who was ceremonially buried with possessions that even he – powerful though he undoubtedly was – could not take with him when he died.



The progress that had been made on the excavation by late May 2015

THE PALACE OF NESTOR

It is the best preserved Mycenaean palace in Greece and has now re-opened after restoration



One of the Linear B Mycenaean script tablets found at the Palace of Nestor

This impressive complex in the Peloponnese was built around 1300 BCE by King Nestor, ruler of ancient Pylos – who is mentioned by Homer in both the *Iliad* and the *Odyssey* and is reputed to have taken part in the Trojan War.

Perched on a hilltop with glorious views of Navarino Bay, it was an administrative, political and financial hub. In addition to the main palace stood the king's residence – a smaller, older palace – and a large workshop or guardhouse. The residential buildings were two storeys high with 105 rooms on the ground floor alone.

The site was first excavated in 1939 by Carl Blegen of the University of Cincinnati, who discovered a large cache of clay tablets written in Mycenaean Linear B script, an adaptation of Linear A script used by the Minoans in Crete, therefore demonstrating a clear link between the two cultures. Excavations resumed after the war in 1952 and continued until the 1960s, when the works revealed the presence of a huge throne room with a circular hearth, a brightly coloured geometric floor and walls decorated with fine frescoes. Storerooms were filled with hundreds of wine cups. Perhaps most famous is the bathroom, which boasts a deep, decorated bathtub ideal for luxurious royal soaks. According to legend Nestor's daughter bathed Odysseus' son Telemachus here. The complex burned down in 1200 BCE and was never rebuilt.

The palace has now re-opened to visitors after a three-year restoration, costing €2.5 million.

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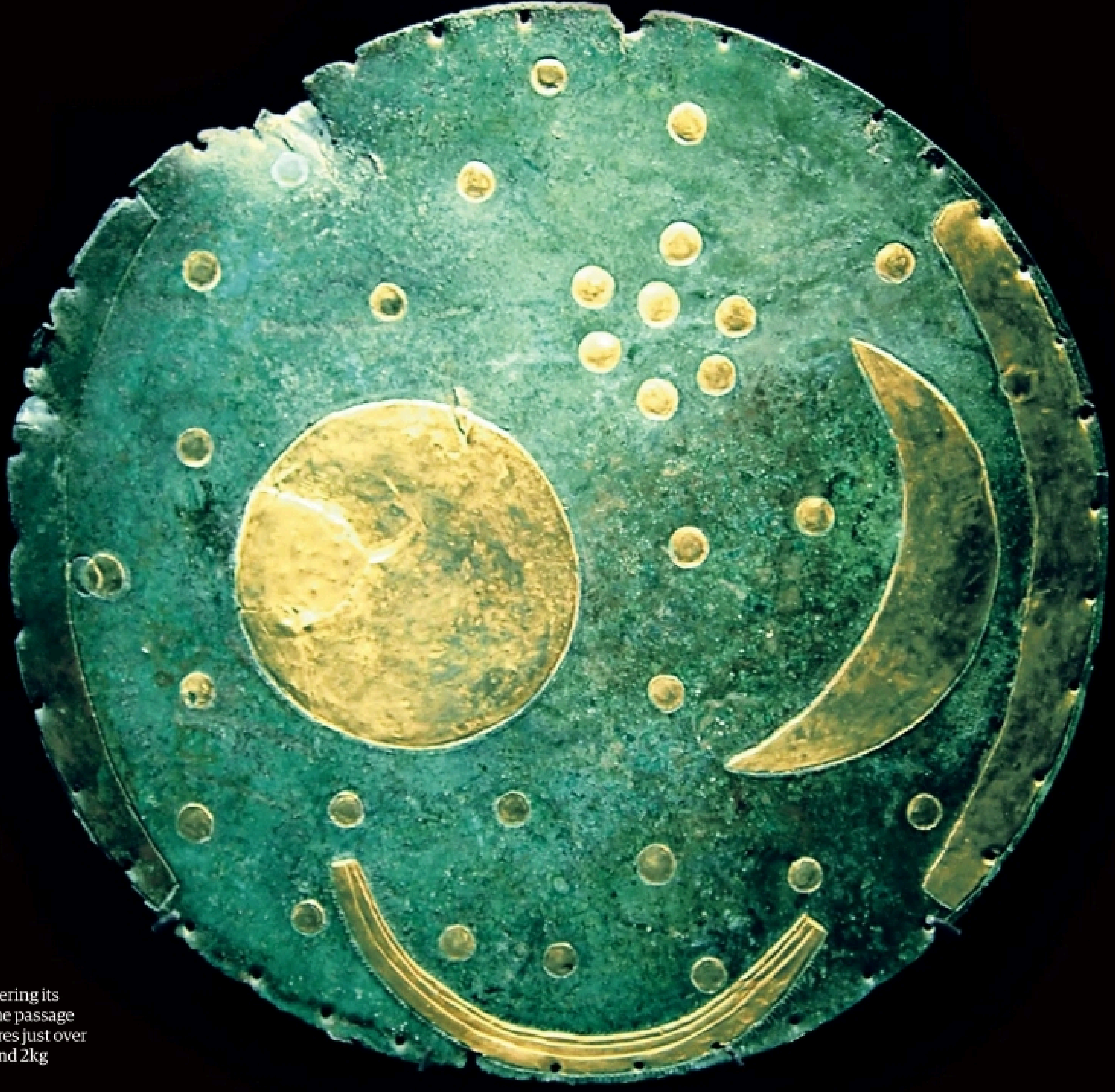
THE NEBRA SKY DISK

Considered the oldest depiction of the heavens by many, is this Bronze Age disk an ancient calendar, or merely a work of art?

Written by **Dee Dee Chainey**

The Nebra Sky Disk is an artefact whose discovery was steeped in controversy. Initially labelled a fake due to its startling artistic style, unlike anything else known from the German Bronze Age, this bronze disk is now considered one of the most important archaeological finds of the entire 20th century.

Thought to be the earliest existing depiction of the night sky to date, many have tried to decipher its symbols. Some suggest the inlaid gold patterns show the heavens: a crescent Moon, stars, and



With a green patina covering its bronze surface due to the passage of time, the disk measures just over 30cm, and weighs around 2kg

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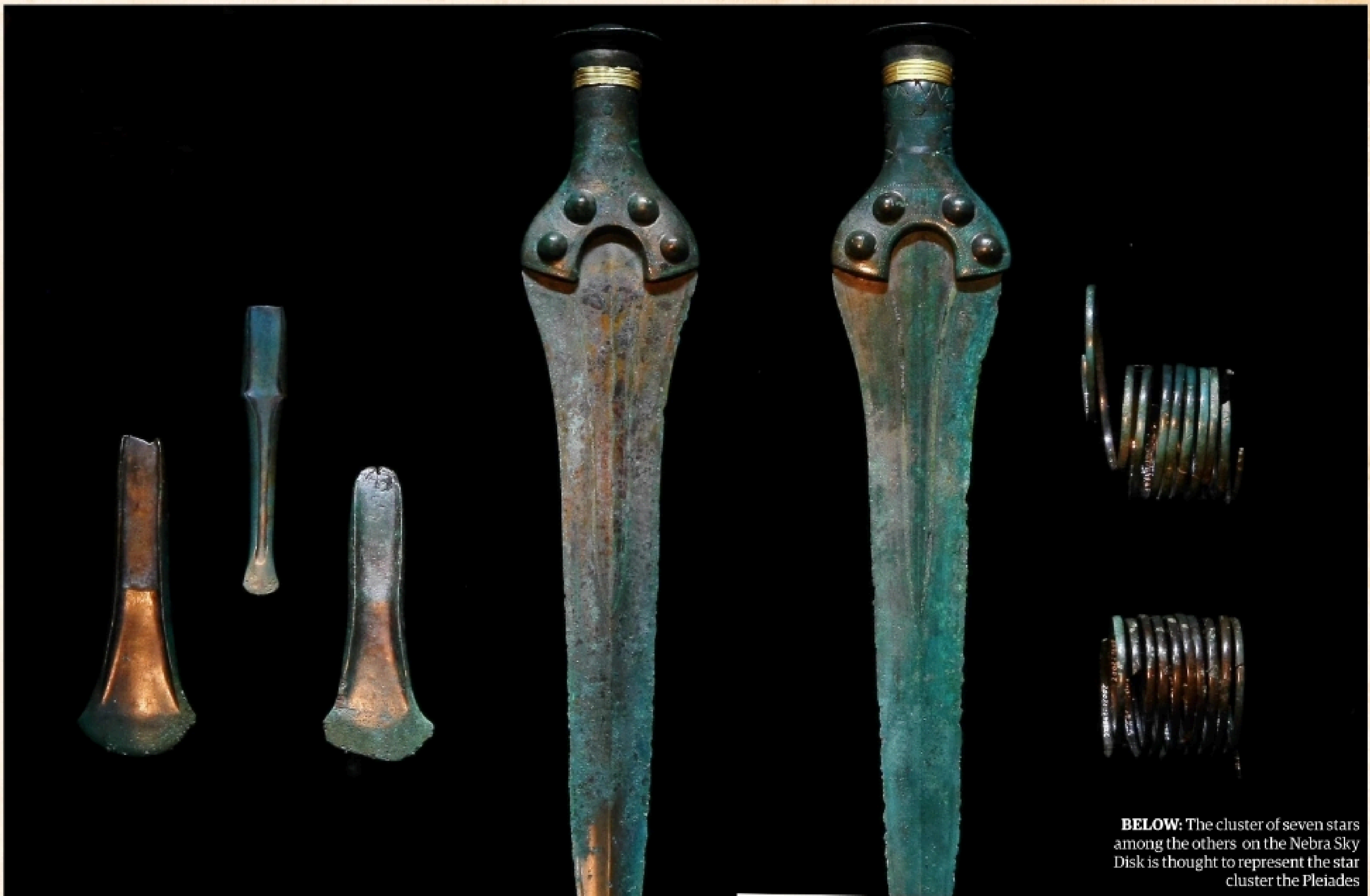
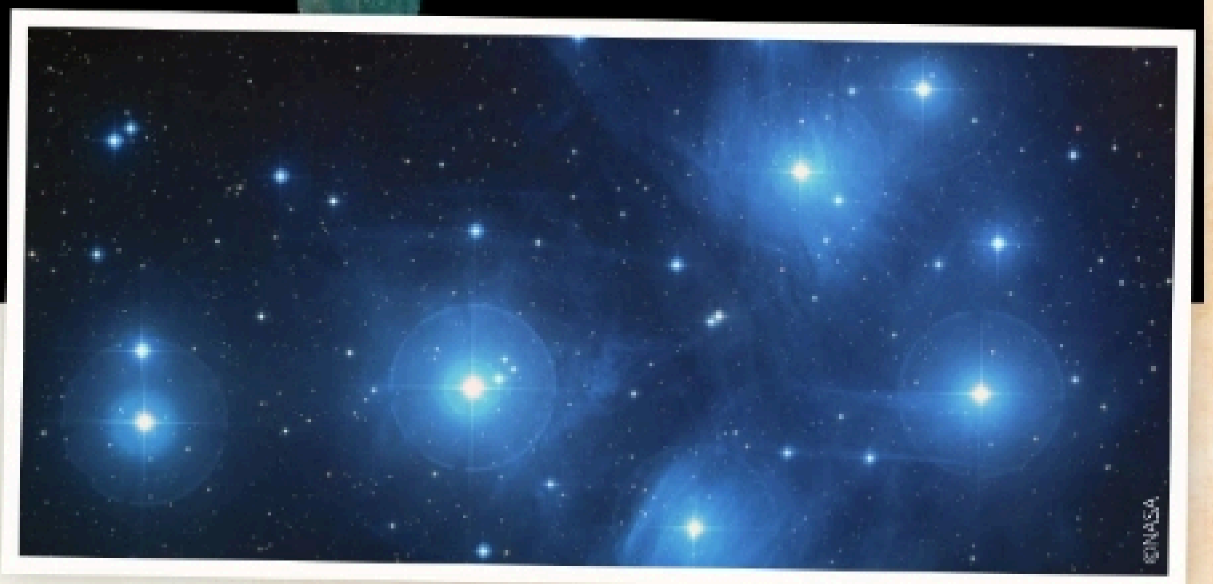


ABOVE: The Nebra Sky Disk was found alongside other items from the same period, including weapons and jewellery

©Getty; ullstein bild

BELOW: The cluster of seven stars among the others on the Nebra Sky Disk is thought to represent the star cluster the Pleiades



©NASA

either full Moon or Sun. The gold crescent is often seen to be a solar barge, while one curved gold edge is thought to be the horizon. While its true purpose is unknown, some say it is a work of art, though many argue it holds unfathomable religious symbolism. A few have hypothesised that it may even be an early astronomical clock.

The disk was covertly unearthed by two metal detectorists from a prehistoric enclosure at Mittelberg Hill, a site in Nebra, Saxony-Anhalt. The disk was damaged by the treasure hunters when it was pulled from the ground, shattering the outer rim, breaking off a large piece and causing the loss of a star. The two men, Mario Renner and Henry Westphal, unearthed the disk as part of a hoard, containing two ceremonial bronze swords – which would be too soft for actual use in warfare – a chisel, a couple of hatchets, and assorted parts of spiral bracelets.

Like in many other places, finds of this nature automatically belong to the state in this region; treasure hunters operating without a license are considered looters, and are operating outside of the law. The pair found this out only after attempting to sell the disk to archaeologists, yet this did not deter them; they attempted another sale in 2003, approaching an antiques collector in Switzerland, and asking for a cool $400,000. Yet, little did they know they were at the heart of a police sting. The fraudsters were arrested after attempting the sale in the basement of The Hilton, Basel, and the irreplaceable disk was taken to safety so that it can be studied and preserved.

After proper assessment, archaeologists believe the disk to originate from the Unetice Culture, a Bronze Age culture dating back to around 1600 BCE. The Nebra Sky Disk was added to the UNESCO Memory of the World Register in 2013. While some suggest it is just one of a pair, with the other still to be discovered, nothing like it has been found again to this day.

> "While its true purpose is unknown, some say it is a work of art, though many argue it holds unfathomable religious symbolism. It may even be an early astronomical clock"

TOYS OF THE INDUS VALLEY

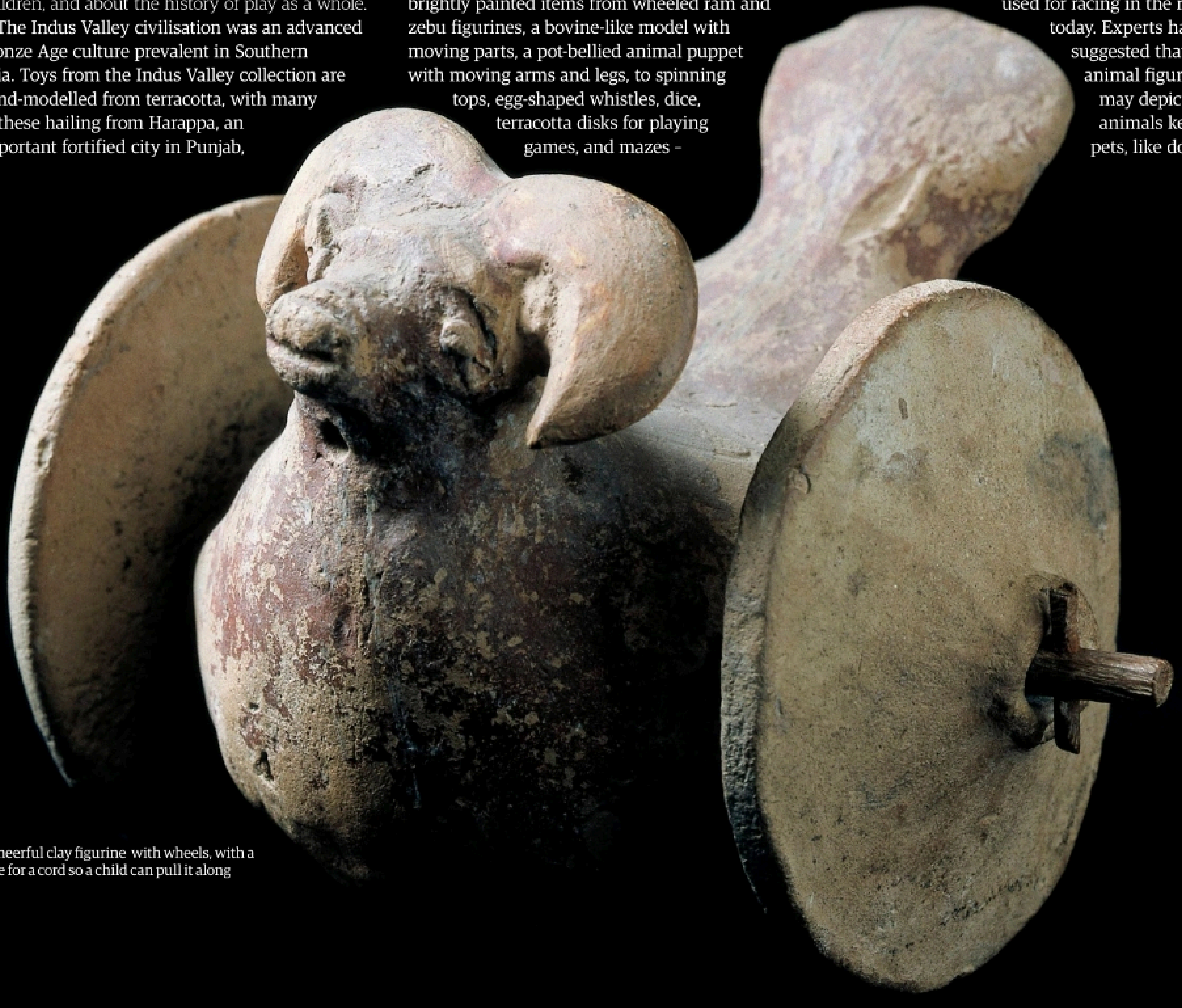
From puppets and spinning tops, to carts with moving wheels, a treasure-trove of children's toys have been unearthed from settlements throughout Southern Asia

Written by **Dee Dee Chainey**

While the Indus Valley toys are not the oldest, they are one of the largest collections in existence and provide detailed information about what life was like for Bronze Age children, and about the history of play as a whole.

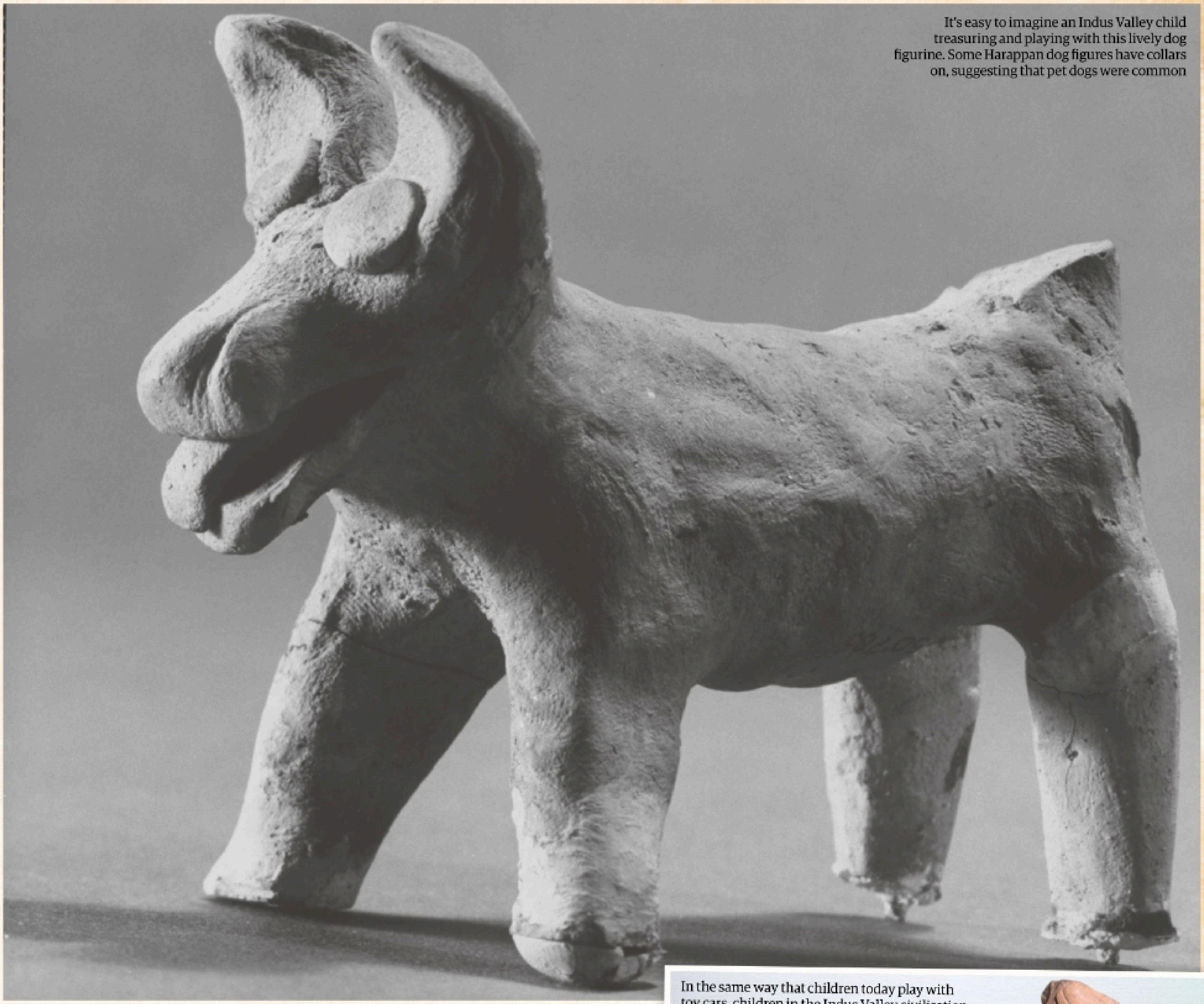
The Indus Valley civilisation was an advanced Bronze Age culture prevalent in Southern Asia. Toys from the Indus Valley collection are hand-modelled from terracotta, with many of these hailing from Harappa, an important fortified city in Punjab, Pakistan. Experts believe that they are miniature replicas that depict everyday activities and items, reminiscent of the Playmobil sets that children use today.

Dating to 2500 BCE, the collection includes brightly painted items from wheeled ram and zebu figurines, a bovine-like model with moving parts, a pot-bellied animal puppet with moving arms and legs, to spinning tops, egg-shaped whistles, dice, terracotta disks for playing games, and mazes – presumably designed as marble runs! Models of oxen or water buffalo pulling carts with moving parts are common finds from settlements from the Harappa culture, revealing much about the role of animals in daily life – such carts are still used for racing in the region today. Experts have suggested that some animal figurines may depict animals kept as pets, like doves



A cheerful clay figurine with wheels, with a hole for a cord so a child can pull it along

©Getty/Leemage



It's easy to imagine an Indus Valley child treasuring and playing with this lively dog figurine. Some Harappan dog figures have collars on, suggesting that pet dogs were common

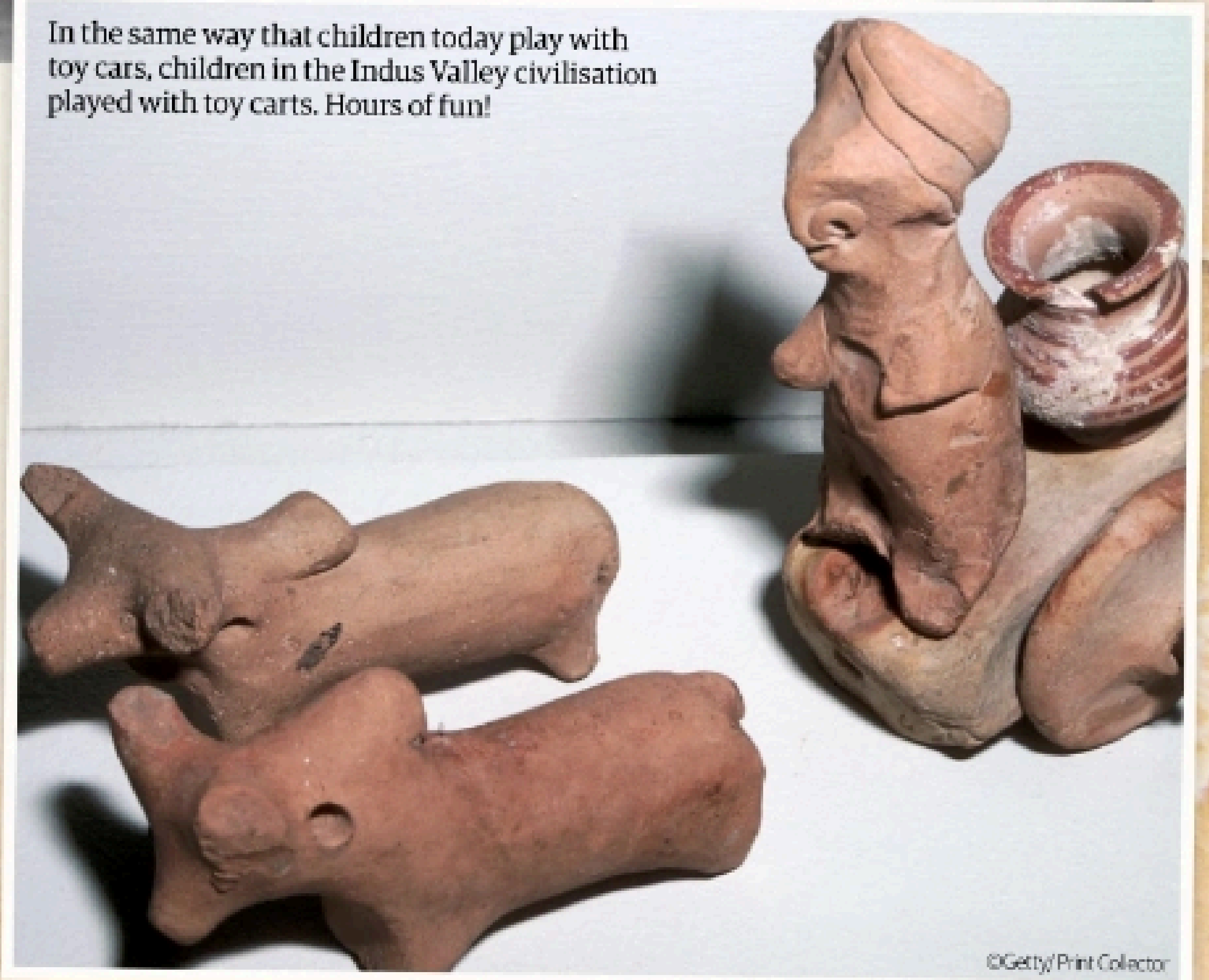
©Getty/Larry Burrows

"Reminiscent of the Playmobil sets that children use today"

and other birds. Many of these toys are now on display in the National Museum in New Delhi.

Only a few toys older than the Indus Valley examples have ever been found, and these were carved rather than being modelled from clay. The oldest in the world were unearthed from a child's grave at the archaeological site of Itkol II in Siberia. Dating back to the Bronze Age Okunev culture, the collection included a two-inch long soapstone doll's head, presumably with the rest being made up of organic material that has since rotted, and a horse head carved from either antler or horn. Miniature figures, though to be rattles from the same period, were found in an infant's grave nearby. The oldest toy in Europe, specifically, is a stork figure that can bob up and down to 'drink water'. This was only found recently, at a Bronze Age site in the Rhodope Mountains in Bulgaria, dating to around 1500-1200 BCE.

The fact that some Bronze Age toys appear in children's graves reveals how parents in the distant past grieved in exactly the same way as we do today.



In the same way that children today play with toy cars, children in the Indus Valley civilisation played with toy carts. Hours of fun!

©Getty/Print Collector

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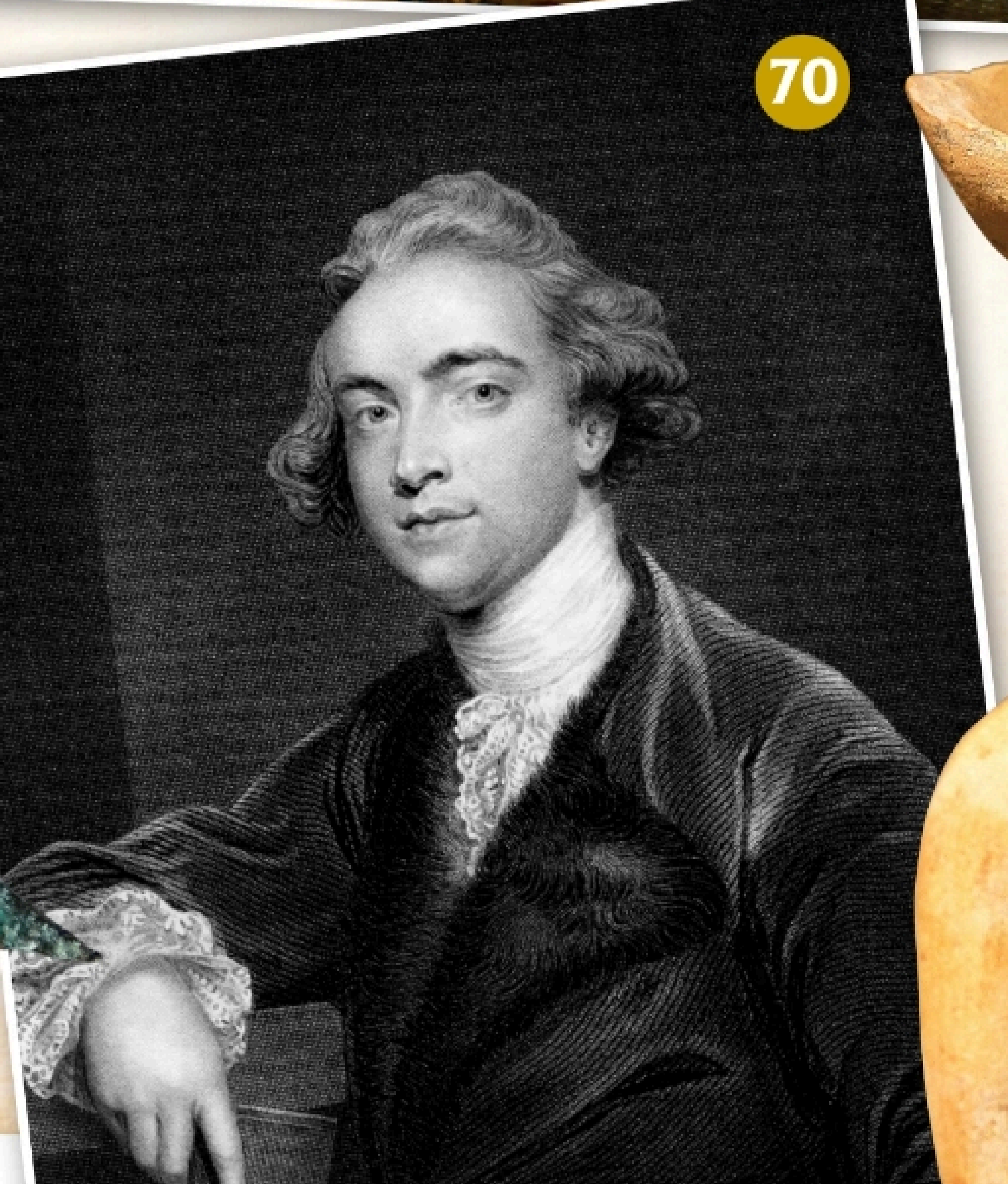

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THE CITIES OF ANCIENT SUMER

The first civilisation to develop writing also created many of the other things we consider cornerstones of civilisation itself

Written by **Ben Gazur**

Much of archaeology is guess-work – educated guess-work, but still based on interpretation of often cryptic physical remains. While statues, homes and tools can all be evocative, they are silent relics of a history that will always be closed to us to some extent. With the rise of the Sumerian city-states and civilisation as we know it, however, we are granted our first chance to engage with the Bronze Age directly because they wrote down what they experienced.

A HISTORY OF SUMER

It is impossible to say when the first people moved into the area that would later be caller Sumer, the valley between the Tigris and Euphrates rivers in what is modern-day Iraq. Evidence of habitation at al-Ubaid has given the time before the rise of the Sumerian city-states the name the Ubaid period. Lasting from around 6500-4000 BCE, this was a period of agricultural settlement when hunter-gatherer people began to form villages and towns. Pottery, tools and figurines give us hints at the society they created.

At some point the people we call Sumerians entered the area. Calling themselves 'sang-ngiga' – 'the black-headed people' – they brought a language to the region quite unlike those spoken in the area already. Taking over the villages of the Ubaid people, they kept the names of these locations but transformed them into real cities.

Named after one of the great cities of Sumer, the Uruk period from 4000-3100 BCE saw the emergence of the cities that would dominate the area for the next several thousand years. The city of Uruk is considered by many to be the first true city anywhere in the world, and it grew into the largest in later centuries with up to 80,000 people living within its mighty walls. The ancient *Epic of Gilgamesh* boasts about these walls: "Behold the outer walls which gleam with the brilliance of copper; see the inner wall which none might rival."

While archaeologists consider Uruk to be the first city, the Sumerians themselves thought that Eridu was the place where "the kingship descended from heaven". Civilisation for the Sumerians was a gift, or rather series of gifts, given by the god Enki. Fittingly it was Enki who was the patron deity of Eridu. All of the Sumerian cities had a patron god who was thought to dwell within its walls. At Nippur, the chief god Enlil was considered to be the actual king of the city, making a human ruler unnecessary.

The cities of Sumer were fiercely independent of each other despite sharing common language and religion, and wars between them were a common event. Sometimes a king of one city could conquer several others and rule them for a period. The empire of Lugal-Anne-Mundu, around 2600 BCE, may be the first in recorded history after he took control of Uruk, Ur and Lagash. Eannatum, king of Lagash, would later conquer all of Sumer and set up a victory stele showing his dead enemies being consumed by vultures.

It may well have been the fractious nature of the Sumerian kings that led to their downfall – by fighting with each other they were unable to withstand outside pressures. Sargon of Akkad created the Akkadian Empire, which brought

"The cities of Sumer were fiercely independent of each other despite sharing common language and religion"

The Sumerian King List records both historical figures who ruled in Sumer and mythological kings whose reigns lasted hundreds of years

© Wiki images

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The Standard of Ur, dating from around 2600 BCE, shows life in the ancient city in panels depicting both peace and war

Sumer under his control. The Sumerians and Akkadians became strongly linked under the empire from around 2330 to 2150 BCE. The bilingual empire changed the cities of Sumer though, and soon Sumerian stopped being a spoken language, living on only in cuneiform inscriptions. Despite a few steps backwards towards Sumerian independence, the city-states that had begun 2,000 years earlier would never be the same again.

SUMERIAN SOCIETY AND RELIGION

It is hard to overstate the importance of religion in the Sumerian cities. In the earliest days, the true powers in the cities were the temple elite. With each city being devoted to a patron deity, the temple of the god was often the most imposing building within the walls. The huge stepped ziggurats came to dominate many city skylines and from these temples a chief priest, called an Ensi, performed the role of temporal ruler and religious leader. In time, the title of Ensi was largely replaced with that of Lughal - 'Big Man' - as the ruler of a city. War between cities made the priesthood secondary to strong warriors.

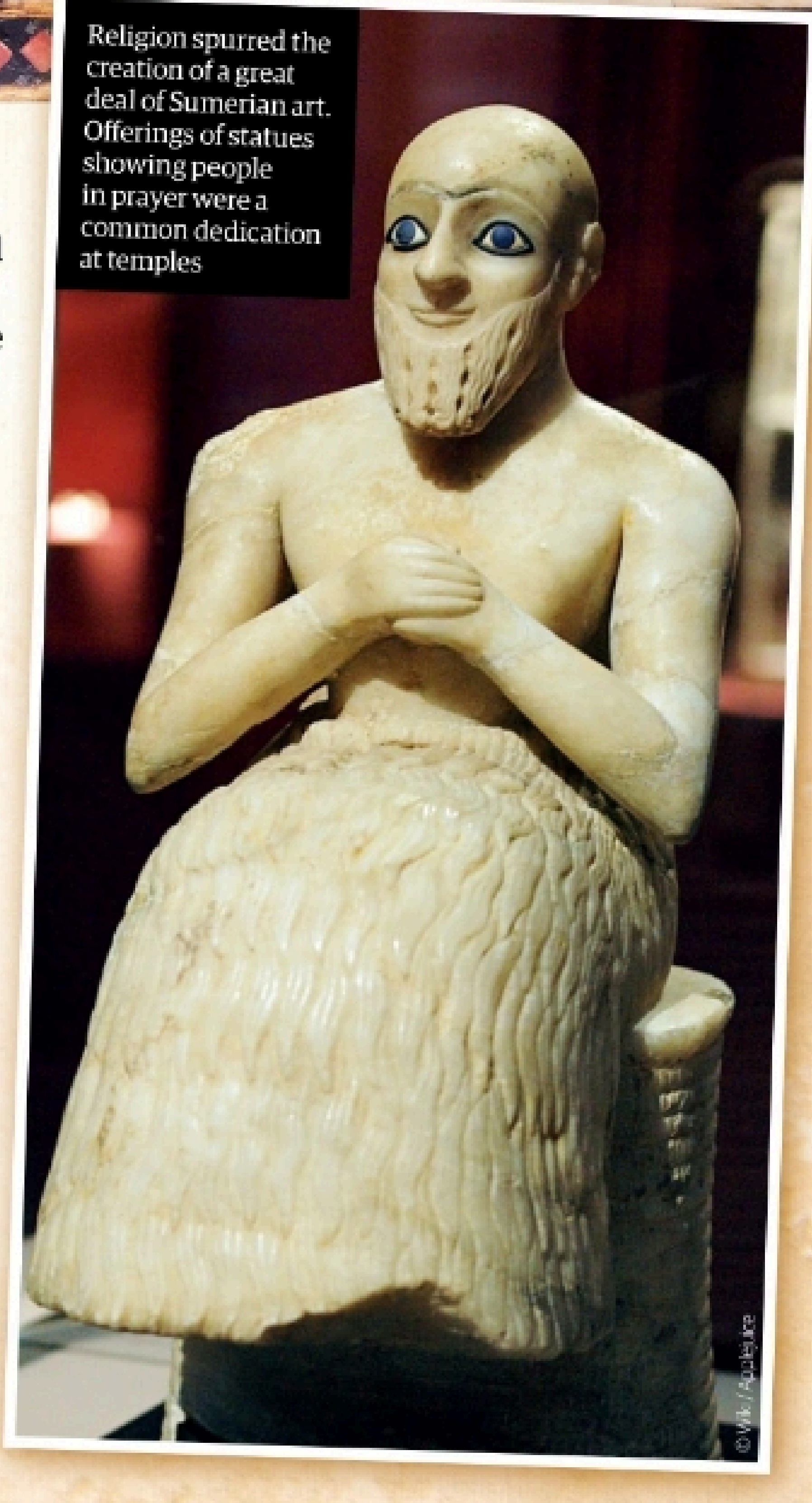
Kingship was still thought of as a divine attribute, with many kings of city-states travelling to Nippur to ceremonially receive their power from the hands of the god Enlil. The Sumerian King List, a document that lists all the names of the rulers of Sumer and their achievements, records how kingship descended from heaven onto a man called Alulim in the city of Eridu. Of course it then says he ruled for 28,800 years, so it is probably not to be taken literally, but nonetheless, the King List does offer us a useful view of how kings were regarded in Sumer.

One woman is listed among the rulers on the King List and her story again shows how heaven and Earth were linked for the Sumerians. Kubaba, a tavern mistress, one day gave bread and water to fisherman catching an offering for the god Marduk. When Marduk saw her devotion to him he granted Kubaba "sovereignty over the whole world".

Beneath the kings and priests, the majority of people would have been involved in the hard everyday work of agriculture and producing enough food to survive. Between these two extremes fell the craftsmen and the scribes. The craftsmen utilised their skills to produce the things that made civilisation preferable to hunter-gathering, and the scribes helped to organise both the city and trade between cities.

SUMERIAN TECHNOLOGY

The Sumerians were expert metallurgists who worked extensively with copper to create small objects like pots, swords and arrowheads. They may also have been the first to add tin to copper



Religion spurred the creation of a great deal of Sumerian art. Offerings of statues showing people in prayer were a common dedication at temples

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TEXTS OF THE SUMERIANS

Because the Sumerians wrote on clay that was baked hard, many of their texts have survived when other materials would have perished long ago. This leaves us with an amazing insight into their lives.

In one religious text we learn how the goddess Inanna managed to get Enki drunk and steal from him all that was good for civilisation: "Holy Inana received the craft of the carpenter, the craft of the coppersmith, the craft of the scribe, the craft of the smith, the craft of the leather-worker, the craft of the fuller, the craft of the builder, the craft of the reed-worker." She also got hold of kindness, heroism and power.

In the mundane world of warfare we have letters written by subordinates to kings to warn "now the enemy troops have risen up". There are also letters to kings begging for help: "Let no one waste my father's household, let no one take away my father's estate."

More touchingly, we have records of personal letters that could have been written at any point in history because of the emotions they share. "Journey is to be added to journey after journey. I shall not be able to look after our mother."

Cuneiform recorded everything from the *Epic of Gilgamesh*, shown here, to the plaintive letters of family members

© Wiki / Osama Shukir Muhammed Amin

to make bronze, and this ability to make a tough and durable alloy revolutionised life for the Sumerians. Everything from warfare to agriculture was adapted to make use of bronze. This was possible because of the complex web of trade that existed in the region.

Due to the relative lack of local resources such as wood, it had long been necessary for the Sumerian cities to trade with outsiders. Soon not only practical materials but decorative ones were being brought into Sumer. Lapis lazuli is a startling blue stone that was a particular favourite of the Sumerians, and it may have been brought into the region from Afghanistan, one of the few areas it was found. As Afghanistan is also rich in the tin needed to make bronze, it is possible that a tin trade followed the same route.

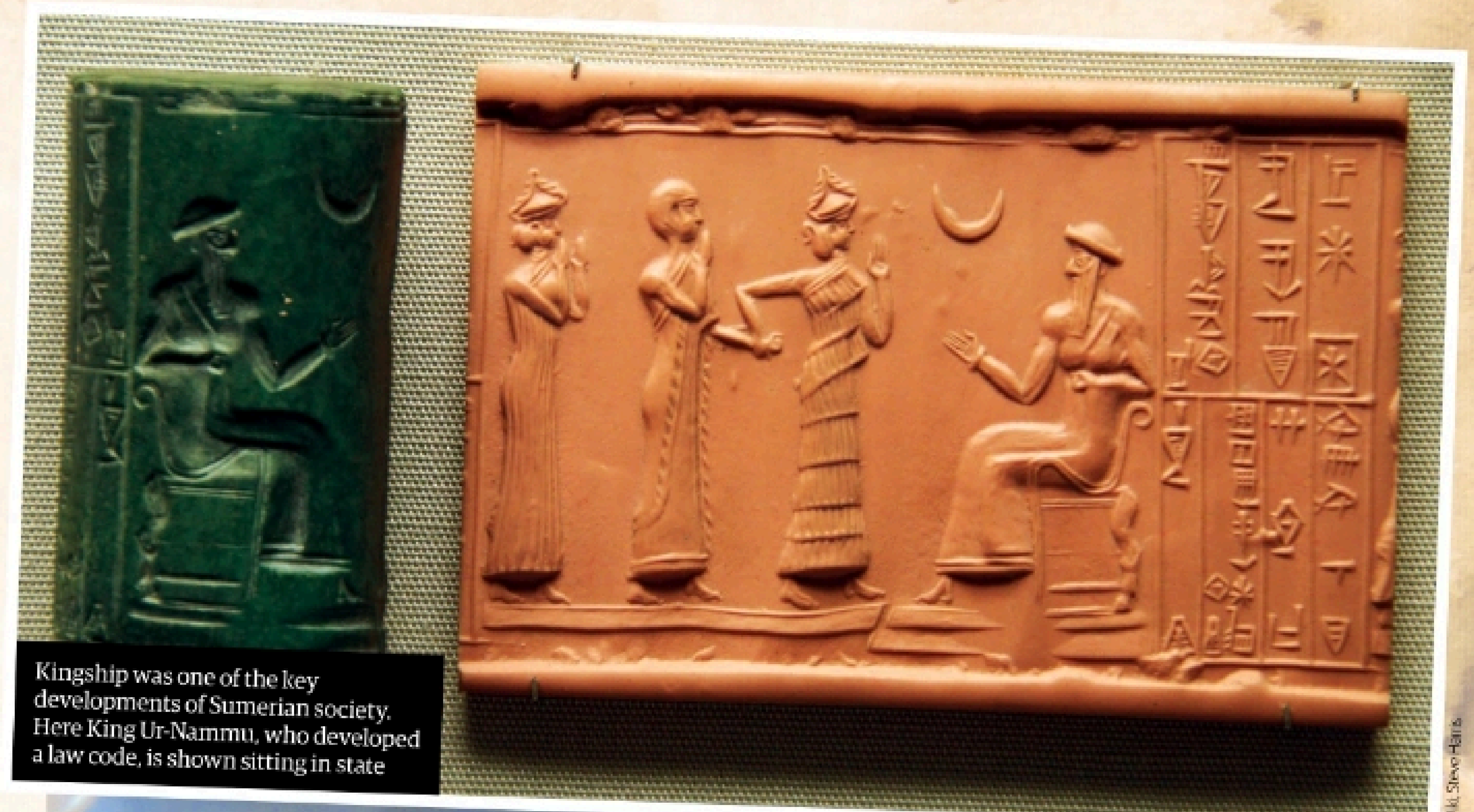
The development of a writing system allowed for the complex administration required to make use of this trade network. Proto-writing has been found from several locations, but the earliest complete formal writing, and certainly the earliest that we can read, comes from Sumer. Cuneiform – wedge-shaped symbols – became the dominant writing system in the region and it lasted for millennia, and the scribes who wrote it on the clay tablets played a vital role in Sumerian society. While it was mostly a male pursuit, we do know of some female scribes, like Amat-Mamu, who acted as scribes for temples around Sumer.

Beyond the prosaic use of literacy to record trade and inventories, it was used in epic tales, religious hymns and royal propaganda. It also allowed for laws to be promulgated and legal cases to take place. The Code of Ur-Nammu is the earliest survivng legal text and tells us how equality under the law was established: "The orphan was not delivered up to the rich man; the widow was not delivered up to the mighty man; the man of one shekel was not delivered up to the man of one mina."

Of course, for most Sumerians writing and trade were probably beyond their means. Most would have benefited from more practical inventions like the wheeled cart, irrigation channels that made fields grow and the thick beer that was the pride of cities. Without the writing, however, much of what life in ancient Sumer was like would have been lost to us long ago.

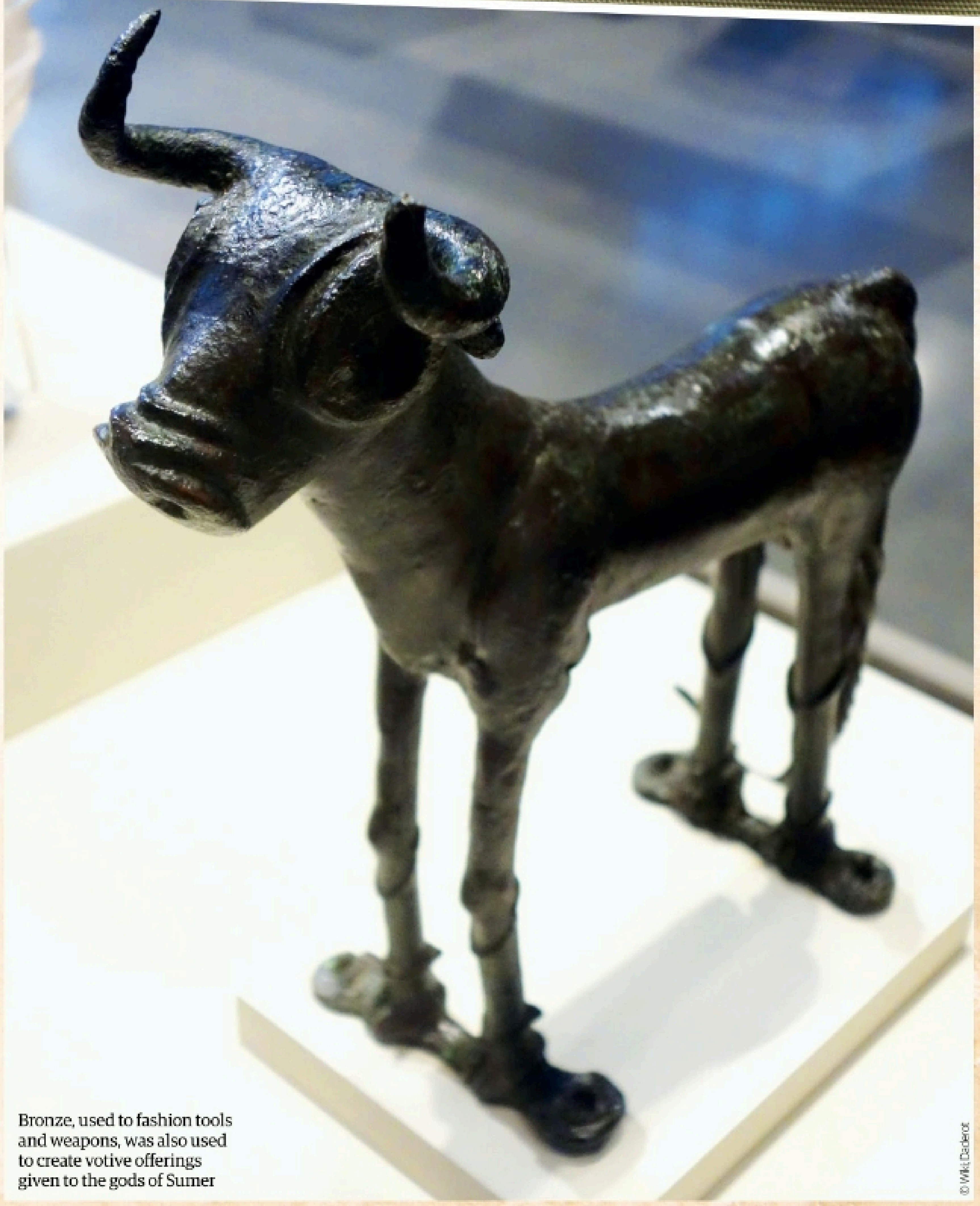
LEGACY OF SUMER

While the Sumerian city-states eventually fell to outside domination, they left a legacy that stretched throughout millennia. Their system of writing developed into one that was still in use over 3,000 years later. The stories they wrote down would find their places in the libraries of kings thousands of miles away and ages undreamed of. The *Epic of Gilgamesh* deals with one man's striving for immortality. In the text that bears his name perhaps he found a way to live beyond the Bronze Age.



Kingship was one of the key developments of Sumerian society. Here King Ur-Nammu, who developed a law code, is shown sitting in state

© Wiki; Steve Harris



Bronze, used to fashion tools and weapons, was also used to create votive offerings given to the gods of Sumer

© Wiki; Daderot

THE INDO-EUROPEANS IN THE BRONZE AGE

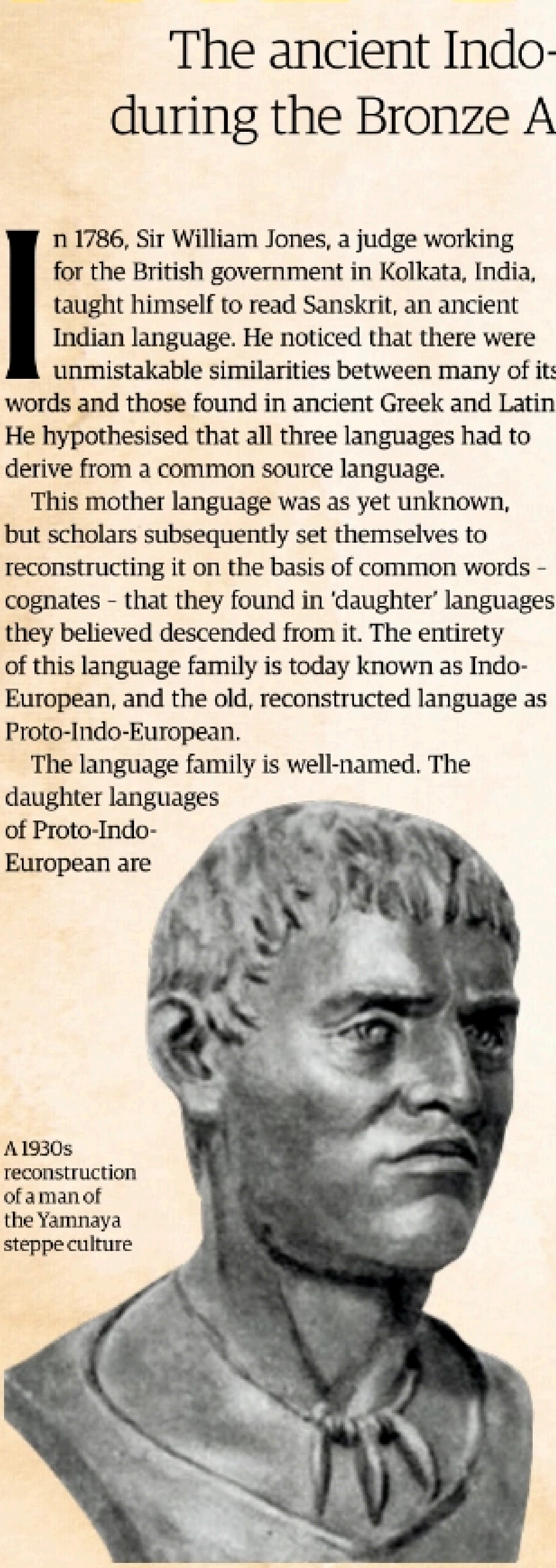
The ancient Indo-Europeans lived on the Pontic-Caspian steppe during the Bronze Age before migrating to Europe around 3000 BCE

Written by **Marc G DeSantis**

In 1786, Sir William Jones, a judge working for the British government in Kolkata, India, taught himself to read Sanskrit, an ancient Indian language. He noticed that there were unmistakable similarities between many of its words and those found in ancient Greek and Latin. He hypothesised that all three languages had to derive from a common source language.

This mother language was as yet unknown, but scholars subsequently set themselves to reconstructing it on the basis of common words - cognates - that they found in 'daughter' languages they believed descended from it. The entirety of this language family is today known as Indo-European, and the old, reconstructed language as Proto-Indo-European.

The language family is well-named. The daughter languages of Proto-Indo-European are very numerous, including Hindi in India and Farsi in Iran, Russian and Polish in eastern Europe, and Scandinavia's Swedish and Norwegian. In central Europe one may find German and Czech, while western Europe's representatives include Dutch, French, English and Gaelic. In southern Europe are Spanish, Portuguese, Italian and Greek.


A 1930s reconstruction of a man of the Yamnaya steppe culture

WHERE DID THE INDO-EUROPEANS LIVE?

In addition to reconstructing the language by working backward from cognates, scholars also attempted to locate the Indo-Europeans' original homeland. One prominent hypothesis for the place where they lived, and then migrated from, is Anatolia, or modern-day Turkey.

In *Archaeology and Language: The Puzzle of Indo-European Origins* (1990), archaeologist Colin Renfrew put forward the argument that the so-called 'First Farmers' - the earliest people to engage in agriculture in Europe, who migrated to Greece from Anatolia at some point before 6500 BCE - brought the Proto-Indo-European language with them. As they spread across the face of Europe, the original mother language began to split into the daughter languages that we can find there today. However, this theory does have one major drawback that makes it unlikely. The various daughter languages of Proto-Indo-European have several important cognates between them relating to wagons and wheels, and this means that the people who spoke the mother language still had to be bound within one linguistic community so that the daughters could all share this common vocabulary.

Archaeological evidence for wheeled vehicles, including actual wheels, pictures of wagons, three-dimensional wheel models and symbols for wagons, becomes abundant only after about 3400 BCE, pointing to the invention of the wagon at about this time. This was long after the First Farmers would have migrated into Europe from Anatolia and begun splitting apart into daughter language communities. David W Anthony in *The Horse, the Wheel, and Language: How Bronze Age Riders from the Eurasian Steppes Shaped the Modern World* (2007), is adamant that any people who might have been the original Indo-Europeans would have had to be living together in one rough geographical location around 3400 BCE, when wagons appeared, before some spread to Europe and others to Iran and India, taking their wagon and wheel words with them.

Instead of the First Farmers from Anatolia, Anthony's candidate for the original Indo-Europeans are the Yamnaya (named after yamnaya, or 'pit graves', in Russian) culture of southern Russia. The remains of the Yamnaya, a nomadic, pastoral people who herded cattle and possessed domesticated horses, may be found on the steppes north of the Black and Caspian Seas, also known as the Pontic-Caspian steppe.

The Yamnaya buried their dead beneath kurgans, artificial mounds, that may be found across the steppe. These burials date as far back as the 4th and 3rd millennia BCE, placing the Yamnaya on the steppe in one general spot at the same time that wagons were invented. The remnants of about 250 wagons have been uncovered in these kurgans, proving that the

"The Yamnaya buried their dead beneath kurgans, artificial mounds, that may be found across the steppe"

The Indo-Europeans in the Bronze Age

While working as a judge in Kolkata, British judge Sir William Jones hypothesised the existence of a common ancestral language for Sanskrit, Greek and Latin

© GETTY IMAGES

The ancient Indo-Europeans worshiped a 'sky father' deity, akin to the Jupiter of the Latin-speaking Romans

The Pontic-Caspian steppe was the home of the nomadic speakers of Proto-Indo-European

The Kernosovskiy idol of the Yamnaya culture, a stone stela carved in roughly human shape, dating to circa 2500 BCE

Yamnaya had wagons themselves, in the right time period to be the actual speakers of Proto-Indo-Europeans, as Anthony contends.

WAGONS, WHEELS AND THE INDO-EUROPEANS

Cognate words for wagons and wheels exist in many of the daughter languages, indicating that they derive from common root words that once existed in Proto-Indo-European itself. That the Yamnaya had wagons and lived on the south Russian steppe is undoubted. But is there hard evidence that can demonstrate that they ever moved west to Europe and brought their language with them?

At Plachidol, Bulgaria, there is. Made about 3000 BCE, the Plachidol burial included two wagon wheels, in addition to the deceased, and in form and content is akin to what was found at roughly the same period out on the Pontic-Caspian steppe where the Yamnaya dwelled. Burials of much the same kind have also been found in Hungary, and kurgan mounds have been located in several Balkan nations. The items discovered within them are similar to the grave goods that have been unearthed in Yamnaya kurgan steppe burials to the east. This is solid evidence that these Balkan graves were made by Yamnaya peoples who had migrated westward into Europe.

DNA AND THE INDO-EUROPEANS

Though the Yamnaya people are the most plausible of candidates for the original speakers of Indo-European, there is another wrinkle that has to be accounted for. The Anatolian branch of Indo-European languages, including Hittite, Luwian and Palaic, all three of which are now extinct, does not at all share the wagon and wheel vocabulary that the other daughter languages of Proto-Indo-European do. This suggests that the Anatolian branch of Indo-European speakers split off from the other Proto-Indo-European speakers before the wagon was invented, so at some time prior to 3400 BCE.

Modern science lends a valuable insight into resolving the conundrum. DNA testing of ancient Yamnaya skeletons supports the steppe hypothesis. Modern northern Europeans, people who speak Indo-European's daughter languages, are genetically closely related to the ancient Yamnaya, and this supports a migration from the steppe into central Europe in the distant past. However, DNA taken from ancient skeletons found in Anatolia shows no admixture from the Yamnaya, even though the Hittite language, for example, was clearly Indo-European in origin.

In *Who We Are and How We Got Here: Ancient DNA and the New Science of the Human Past* (2018), David Reich suggests that Anatolian Indo-European represents a language family that moved westward into Turkey, from an 'original' Indo-European homeland somewhere below

> **"At the head of their divine pantheon stood a chief sky god, or 'sky father', as seen in Old Indic's Dyaupitar, ancient Greek's Zeus, and Latin's Jupiter"**

the Caucasus, perhaps in Iran or Armenia, while another group moved north from there, onto the steppe, where they adopted the wagon and the wheel and developed the vocabulary that related to them. It was these steppe people, the Yamnaya, who then spread Proto-Indo-European, with its cognate wheel words, from India to Europe. It is an elegant hypothesis, as it accounts for the differences between Anatolian languages while also allowing the retention of the Yamnaya as the primary carriers of Indo-European language to various parts of Eurasia.

INDO-EUROPEAN CULTURE

Reconstructing Indo-European culture and the world they inhabited, around roughly 4500-2500 BCE, must remain mostly guesswork, as they left no written records of their own. The reconstructed language from which daughter languages descend, as well as dead languages such as Hittite and Latin, have been probed for clues as to the world that the original Indo-Europeans knew or inhabited. They certainly knew sheep, as we find cognate words in Sanskrit (avi), Latin (ovis) and Old High German (ouwi). On the basis of other cognates, we may be confident that the Indo-Europeans were fully familiar with dogs, cattle, horses, pigs and several different types of trees, including oak, willow, ash and birch.

At the head of their divine pantheon stood a chief sky god, or 'sky father', as seen in Old Indic's Dyaupitar, ancient Greek's Zeus, and Latin's Jupiter. They also had goddesses of the Sun and the dawn. Indo-European society itself was likely composed of three main classes: priests, warriors and the common people.

The Indo-Europeans/Yamnaya were also patrilineal, with the bride moving to her husband's household at marriage. Cognate words for 'clan' indicate that they recognised a kinship group larger than that of the family.

Horses were of enormous importance to the Indo-Europeans too, as they pulled the all-important wagons, and were ridden into battle and to cope with large herds of cattle that formed the basis of the Indo-European economy. The use of the wagon, which we have seen is a strong clue as to the location of the identification of the Indo-Europeans and their homeland, was equally important to the prosperity of the Yamnaya. With the wagon, the Indo-Europeans managed to become extremely mobile.

This mobility freed the Yamnaya from being tightly tethered to the river valleys of south Russia. With food and water sufficient for long periods placed in their wagons, they were able to take their cattle herds into the wide lands that lay between the rivers to graze. The wagon made possible the rapid expansion of the Yamnaya over the steppe in the late 4th millennium BCE. As they moved from place to place, they took their languages with them, and the separations that developed between groups nearer or further off became the bases of the Indo-European language families that would exist in later centuries, and that still exist today across Europe and Asia.

A Yamnaya pit grave discovered in southern Russia

© Wiki/Vodolazx

The peoples of the steppe buried their dead in tumulus mounds called kurgan, similar to Bronze Age British barrows

WAGONS AND WHEELS

Pendants in the shape of wheels, dating to the later 2nd millennium BCE, indicating the importance of the wheel symbol in Bronze Age religion

© Wiki / Dbachmann

As the speakers of Proto-Indo-European spread east and west, the words they had for wagon and wheel changed as speech communities became sundered from one another. However, significant similarities remained. For example, in Old English, the word for wheel was 'hweohl'. In Old Norse it was 'hvel', while in Middle Dutch it was 'wiel'. In ancient Greek, the word for wheel was 'kuklos', while in Old Indic it was 'cakra', and in Avestan Iranian it was 'caxtra'. Latin had 'rota', while Old Irish possessed 'roth', and Old High German had 'rad'.

Various daughter languages also shared cognate words for 'axle', the part of a wagon around which the wheels spin (Latin 'axis' and Old English 'eax') and for the 'thill', the harness pole by which a wagon was pulled by a draft animal (Old English 'ar'; Greek 'oisioi'; and Avestan Iranian 'aesa').

Various daughter languages have words meaning roughly 'ride' (Latin 'veho', to bear, convey; Welsh 'amwain', or drive about; Old Norse 'vega', meaning bring, move; and Old High German 'wegan', or move, weigh). Several also derive their words for 'wagon' from this root word.

The centrality of the wagon in the lives of the Yamnaya people is highlighted by the presence of cognates in so many of the daughter languages. Invented around 3400 BCE, the wagon revolutionised steppe life and allowed the Yamnaya to expand across the steppe, and ultimately, to lands far beyond it.

THE INDUS VALLEY CIVILISATION

Cloaked in mystery, the Old World's largest civilisation pioneered grid urban planning and sewage systems, only to disappear completely for thousands of years, still waiting to be understood

Written by **Hareth Al Bustani**

In 1826, a British East India Company explorer encountered an ancient city, hitherto known only to the locals, and assumed to be around 1,500 years old. However, within 50 years, the ruins had been stripped of their fired bricks, which rail engineers had quarried for ballast. In the ensuing decades, archaeologists began to piece together the puzzle, unearthing a lost civilisation, far larger and older in scope than previously imagined. The city robbed of its bricks was Harappa, the power capital of the Old World's largest civilisation, the Indus Valley.

The vast civilisation began with the humblest of roots in around 3300 BCE, when villages sprouted along the flood plains of the parallel Indus and Ghaggar-Hakra Rivers. Drawing upon the region's spectacularly rich hunting and fishing grounds, the Indus soon began to amass high yields of wheat, barley and cotton, building granaries to store their sizable surplus. While previous cultures traded with Iran, Afghanistan and even Turkmenistan, the Indus Valley Civilisation established the first overseas trade route, across the Arabian Sea – helping its major urban centres amass power and wealth. At its peak, the civilisation stretched across more than 500,000 square miles, with 1,500 settlements clustered throughout northwest India, most of Pakistan and into Afghanistan.

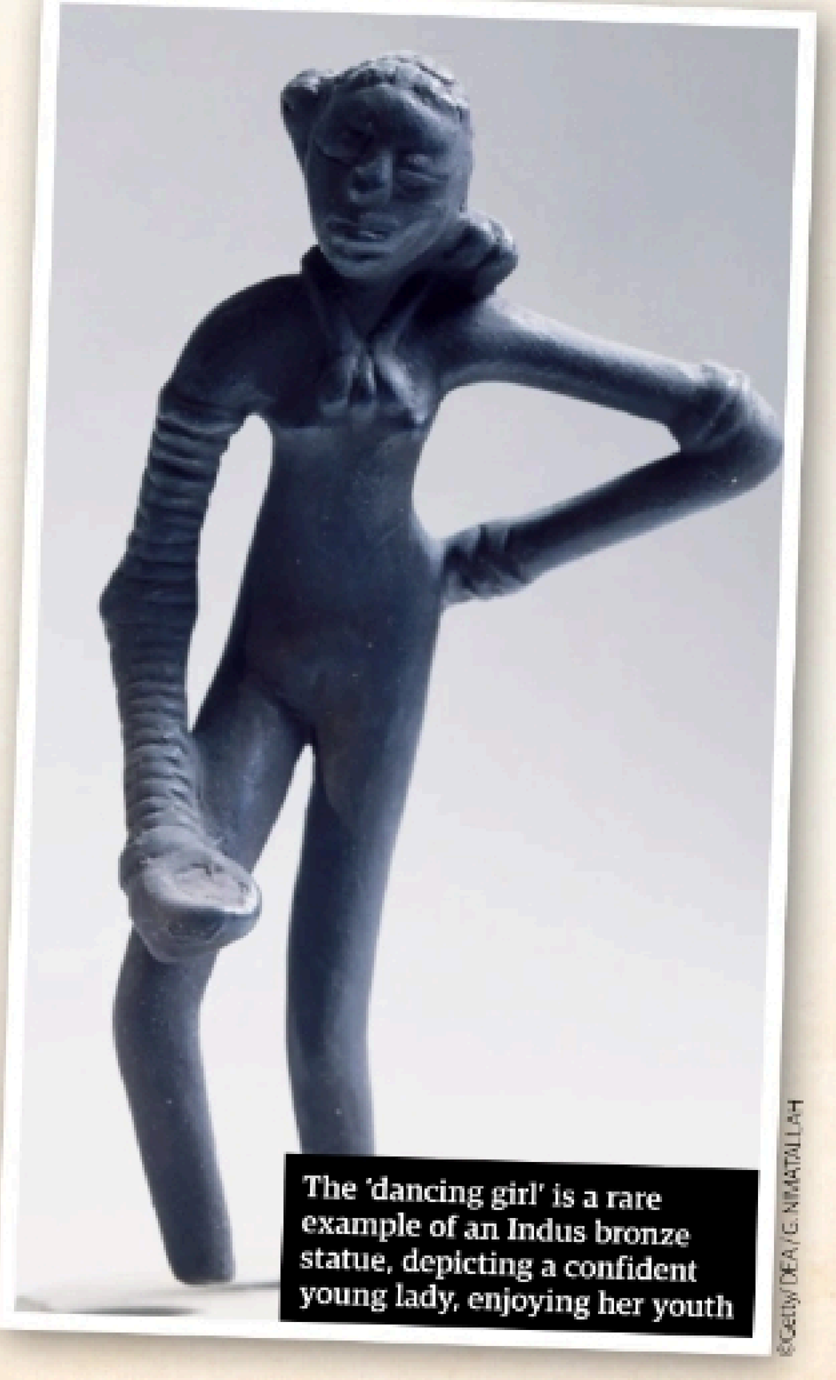
By 2600, the Valley's larger settlements came to resemble state-level societies, with smaller outlying settlements resembling chiefdoms. While the vast majority of its residents lived in small villages, the most powerful cities existed as autonomous city-states. Though surrounded by enormous mud-brick and stone walls, conflict seemed to play, at most, a very minor role in Indus Valley culture, with few arrowheads or spears discovered among its ruins. On the contrary, influence seems to have been exuded through the force of culture, as homogenised systems of urban planning, economy and society reverberated across a region that was twice the size of its counterparts in Mesopotamia and Ancient Egypt.

The two largest settlements, Harappa and Mohenjo-daro, were enormous, housing up to 50,000 inhabitants each. Due to Harappa's apparent pre-eminence, the Indus Valley civilisation is often referred to as the Harappan civilisation. Such cities boasted shared principles of urban planning, with a citadel of large public buildings, built atop a mound to the west, accompanied by a lower residential town to the east. Indus cities were built in a grid, forming parallelograms, with long thoroughfares running north to south and east to west – an urban-planning first. Uniformity was widespread across Indus settlements, down to brick sizes.

Streets were designed in accordance to wind direction, guiding a breeze through the city and ventilating fresh air into homes. Public drains ran through the middle of wide roads, complete with manholes to collect and remove waste. Built around central courtyards, complete with living rooms, private mud houses also featured elaborate indoor bathing and toilet facilities, lined with ceramic tiles. Connecting to the public drains, their plumbing systems were not only advanced compared to their contemporaries', but, in many cases, superior to those found in Indian and Pakistani homes today.

Municipalities also offered public restrooms, with Harappa and Mohenjo-daro both housing large public baths many centuries before the Romans, their central locations indicating a fixation on cleanliness beyond simple hygiene. This implies that ritual purity might have played a crucial role in the Harappan psyche, with dirt and impurity considered to be unholy – a precursor to later Hindu traditions.

Power appears to have been decentralised in the cities, shared among various groups of occupational elites ranging from merchants and ritualists to those in control of land and livestock. However, uniformity across residential and burial areas indicates that, whether one was a priest, warrior, peasant, trader or artisan, there was a higher fluidity of social status than would later become synonymous with the varna or caste systems. Most Indus were given the same funerary rites – placed in a coffin or wrapped in a shroud, and buried atop grave furniture; pottery, jewellery, ornaments and personal artefacts, such as copper mirrors or mother-of-pearl shells. Although these objects certainly seem to demonstrate a belief


The 'dancing girl' is a rare example of an Indus bronze statue, depicting a confident young lady, enjoying her youth

©Getty/DEA/G. NIMATALLAH

> "While the civilisation had a writing system, it remains a mystery as all attempts to decipher it have failed"

©Getty / Werner Forman

Indus Valley cities were laid out in a grid, stretching from long thoroughfares

The Indus Valley's abundance of wheat and barley was a major step in its rapid development, leading to the construction of granaries and grindstones

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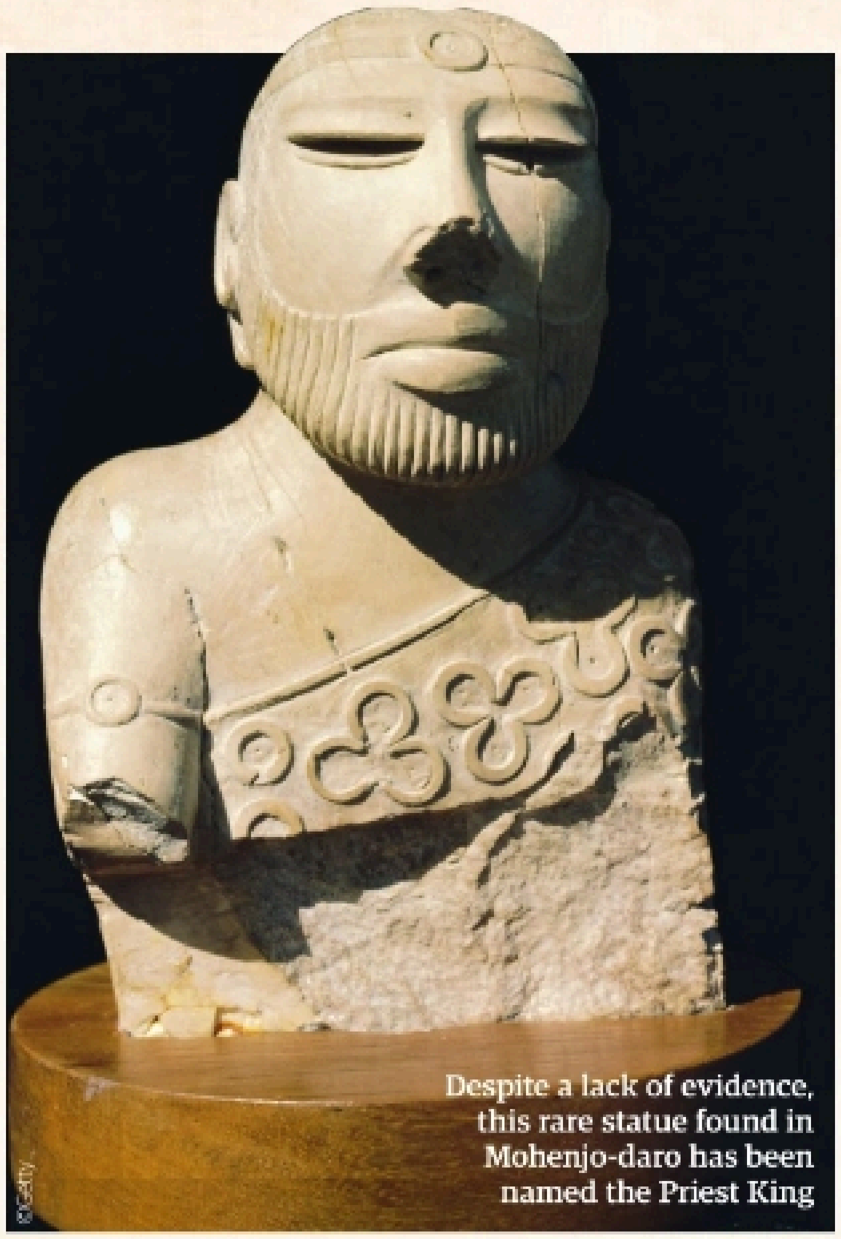

Despite a lack of evidence, this rare statue found in Mohenjo-daro has been named the Priest King

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in the afterlife, the Harrapans' relatively small cemeteries indicate that not everyone was buried; others may have been cremated.

While villagers lived relatively simple lives, herding animals and growing crops, major cities were vibrant centres of culture, trade and industry. Artisans were masters of metalwork, lapidary and ceramics, producing ornaments and tools to use and export to distant lands. Metalsmiths worked with both copper and bronze, creating casts by pouring molten metal into moulds, and adding tin or arsenic to remove bubbles. In this way, they crafted everything from arrowheads and axes to harpoons and small bottles. They also manufactured textiles, using their natural abundance of high-quality cotton.

Meanwhile, potters mass-produced wares in circular kilns, with a stokehole and furnace placed beneath a perforated floor, covered by a dome ceiling. These were primarily designed with function in mind, with potters producing goblets, cups, pans and many other utilitarian objects, using a base of pinkish river clay. They made use of efflorescence, a process that ensures the interior core and glaze are exactly the same colour, while bonding the glaze to the body. Decorated pottery featured bright-red backgrounds, with black designs painted atop – depicting both geometric and naturalistic imagery, such as a fisherman carrying his nets and pole, with a fish and turtle by his feet.

While early Indus settlers made beads from seashells, now they had become increasingly resourceful, crafting beads from gemstones and even gold. Artisans also produced a unique, compact, glassy faience in an assortment of colours. They forged tools, jewellery and dice from ivory, and tanned animal hides for leather for both clothing and sails. Some of their statues show us the kind of clothes they wore.

Though the Indus did not produce much fine art, among a series of limestone statues found at Mohenjo-daro is a particularly curious piece. Just over 17 centimetres high, it depicts a bearded man wearing a robe with one shoulder exposed – a man some have speculated was a Priest King. Bronze statues were even rarer, most notably the renowned 'dancing girl', portraying a woman wearing only bangles on her arm and a necklace, in the throes of dance. It is particularly remarkable, not just in its form, but for its embrace of dance and sensuality.

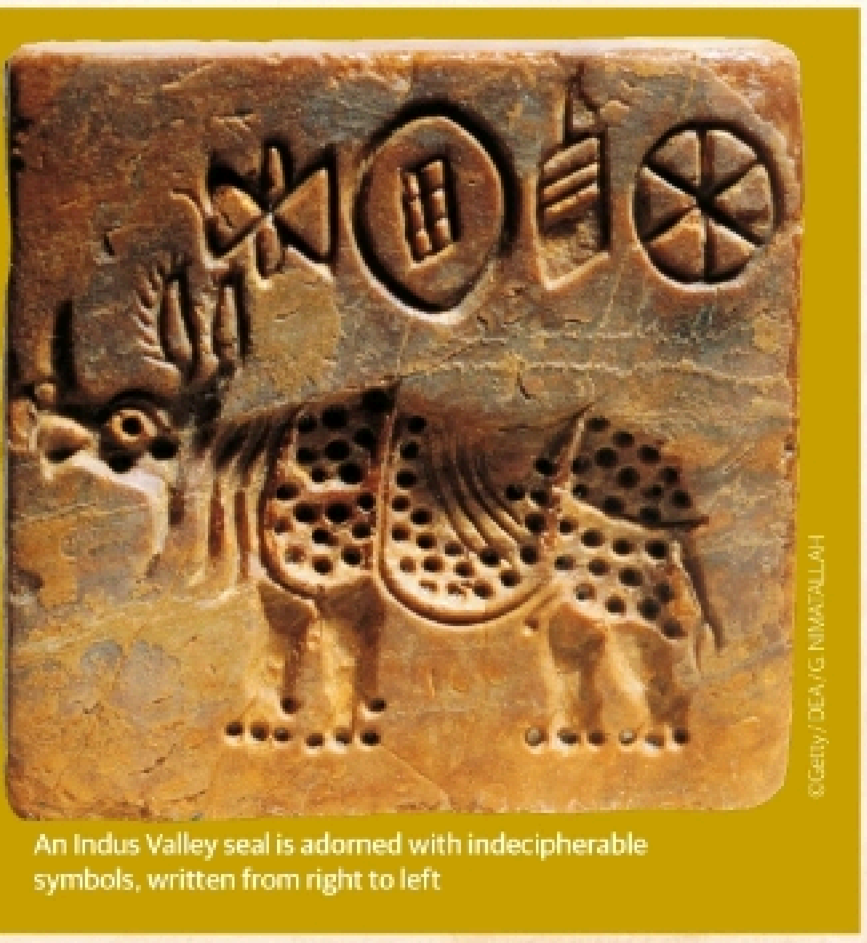
Across the Indus Valley, settlements traded in standardised weights – many found as far away as Oman and Mesopotamia. The Mesopotamians also imported onions, cotton, hardwoods, pearls, carnelian, peacocks and monkeys, in return

THE SECRET SCRIPT

Still undeciphered, the Indus script may just be the key to unlocking the civilisation's greatest secrets

The Indus Valley civilisation developed an intricate writing script, depicting hundreds of logographic visual symbols: dots, lines, geometric shapes, humans and animal forms. There seem to have been between 300 and 700 symbols, half of which were basic, with many compounds – indicating that it may have been a logosyllabic script, where each symbol represents a syllable rather than a single letter. Written from right to left, in rows from the top down, the endemic script adorned seals and trade goods, perhaps conveying ownership information, a protective invocation, or a dedication. It was also imposed on wooden signage, either for administrative purposes, to identify houses or to bless travellers.

Across the Indus Valley, it appears that the rules of language, sentence structure and grammar were homogenous. Though various attempts have been made to decipher it, in the absence of a figurative Rosetta Stone, none have succeeded. Compounding the problem, most incidences of the script are only eight symbols long, with the longest just 17. Another difficulty is in trying to infer pictorial meaning; where one scholar sees a snake, another sees a seated man. The disappearance of the language is perhaps even more bewildering than that of its parent civilisation, and should the code ever be cracked, would unshroud many a mystery.



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An Indus Valley seal is adorned with indecipherable symbols, written from right to left

Ox carts, with wooden wheels fixed to the axle, are still used by Indus farmers to this day

©Getty

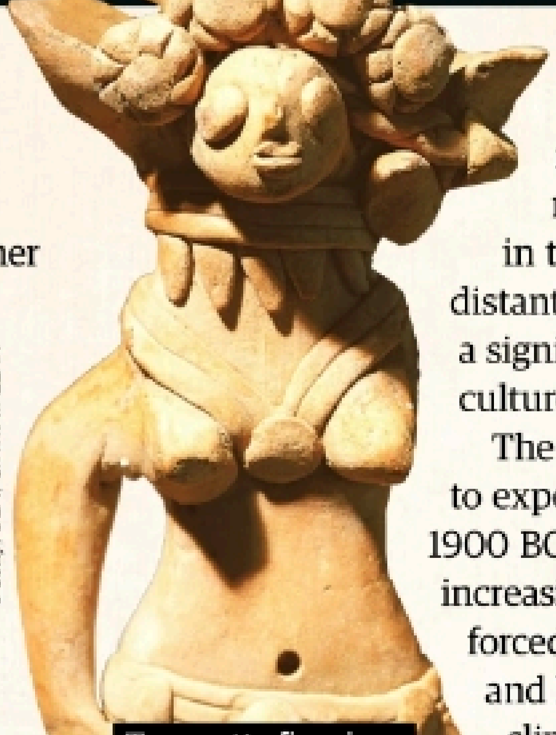
Hygiene was important to Indus Valley residents; cities boasted public and private baths, all connected to an intricate sewage system

©Getty

exporting raw materials, copper, gold, woollen items and perfumes to the Indus Valley. While Indus Valley traders lived in Mesopotamia, Mesopotamians did not settle the other way, suggesting it was a somewhat closed-off society.

Archaeologists have also uncovered hundreds of small soapstone seals, used to stamp designs and inscriptions into soft clay – most likely used by merchants, in the same manner of a signet ring. The most widespread iconography is that of a unicorn, resembling a cross between a humpless bull and an antelope, with long legs and exaggerated genitals. Another depicts what may be a male deity, often referred to as Shiva Pashupati, Lord of the Beasts. Wearing a headdress of buffalo horns with a pipal tree growing from it – the same tree Buddha was said to have achieved enlightenment under – he sits in the lotus position, symbolising meditation and introspection, sometimes appearing with three faces, surrounded by animals, forming a mandala. Other seals feature bulls, baboons, elephants, rhinos, tigers and other animals that were native to the region, often depicted as males.

Terracotta figurines, meanwhile, depict women, with special attention drawn to their prominent hips, thighs, breasts and showy hairstyles. They seem to symbolise the worship of a mother goddess, perhaps used ritualistically in conjunction with an animist spiritual view. Cattle bones found at the fire altars of Kalibangan and Rakhigarhi indicate that perhaps these were offered in sacrifice. With a lack of temples, religious ceremonies were most likely conducted in the open, and decentralised worship practiced at home. It is also possible that while the mass of culture was homogenised in the larger cities, even the distant rural Indus may have played a significant role in tweaking their culture and traditions.



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Terracotta figurines seem to depict a mother goddess with exaggerated features of femininity

The Indus Valley civilisation began to experience a rapid decline from 1900 BCE, with settlements becoming increasingly isolated from one another, forced to rely on their own resources and local trade networks. Uniformity slipped away from town planning, craftsmanship and virtually all other aspects of life. As the civilisation went into freefall, drains fell into disrepair, houses were built of inferior quality using salvaged bricks, and heavy industry splintered off into little workshops. In Mohenjo-daro, as the living took to burying their valuables, the dead were given unceremonious send-offs in derelict houses and streets.

Over the next 500 years, the settlements withered and disappeared, with a gradual exodus to new settlements in nearby Gujarat, the Kachi Plain and east Punjab. Here, despite slipping into obscurity, Indus Valley bead making, metallurgy, ceramic production, glazed faience and architecture were all kept alive. After a long hiatus, traditional traders have re-embraced the Harrapan standardised use of weights, and Indus farmers still use the same wooden-wheeled ox carts to this day. However, with the complex Indus writing system still undeciphered, the civilisation's true cultural legacy remains shrouded in mystery, patiently waiting to one day be discovered again.

Artisans crafted a variety of beads, from seashells, gemstones and an innovative form of glassy faience

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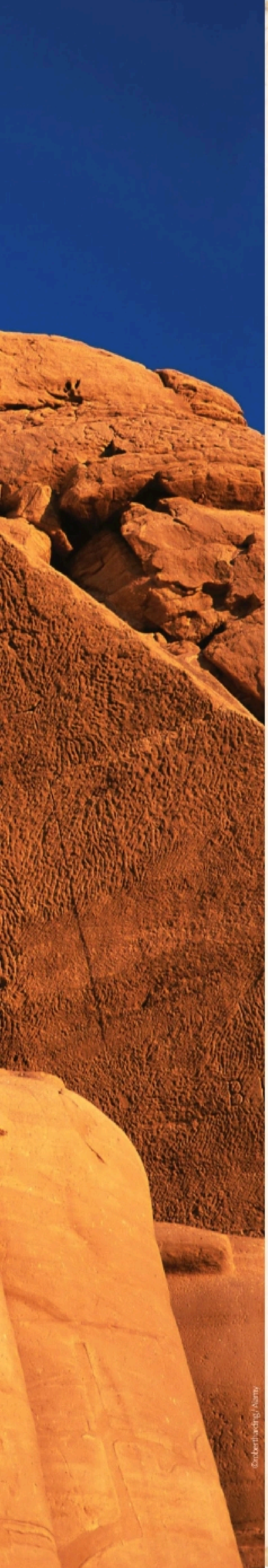
After a long day's work in the fields, or at the kiln, Harappans enjoyed playing board games



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THE KINGDOMS OF ANCIENT EGYPT

Spanning many eras, the New, Middle and Old Kingdoms would see the pharaohs reach the peak of their power and Egyptian culture soar

Written by **Dom Reseigh-Lincoln**

For 3,000 years, the ancient Egyptian empire endured. It emerged, like so many other independent kingdoms, from the ruins of warring and fragmented fiefdoms and grew into a nation that shook North Africa and the surrounding world to its core. It became an epicentre for culture and religion, where science and magic were intertwined as one. But those golden ages, those heights of human achievement that challenged even those of Greece and Rome at their peaks, were not achieved in a day.

> "When it came to the New Kingdom, the building of pyramids was considered unfashionable"

Before the Assyrians came, before the Persians invaded, before the Greeks conquered and the Romans annexed, the Egyptians rose and fell all by themselves. While darker periods would form between them (three in fact, known as the Intermediate Periods), the timeline of ancient Egypt has been defined by three distinct eras: the Old Kingdom, the Middle Kingdom and the New Kingdom. A time of cultural rebirth and monumental construction, it was during the Old Kingdom that iconic structures that have endured millennia were built. The Middle Kingdom was when a nation was unified and forged anew. Then the realm was aggressively expanded and culture fostered like never before in the New Kingdom.

Ancient Egypt wasn't just an era of military conquest and expansion, it was a time of innovation too. The Egyptians invented early forms of cosmetics, including eye makeup; they were one of the first civilisations (alongside Mesopotamia) to evolve a robust written language; they created papyrus thousands of years before the Chinese produced paper; they designed the basic calendar structure that we still use today; they can even lay claim to inventing bowling and early forms of breath mints.

In short, they were a nation the like of which we've never seen before or again. Gods, pharaohs, pyramids, mummification, agriculture and much more helped to define the ancient Egyptians as one of human history's most fascinating and intelligent civilisations.

FAMOUS FACES THROUGH TIME

Uncover the celebrities of each kingdom of this great civilisation

THE OLD KINGDOM

Djoser c.2670 BCE

Of all the kings that ruled Egypt in the infant years of the Old Kingdom, the pharaoh Djoser is perhaps the most influential. He may not have been the man who united Egypt as one like Narmer, but he typified two characteristics that would go on to define ancient Egypt. He conducted military campaigns that solidified and expanded the borders of the empire while nurturing the growth of his nation's culture. He also commissioned the first pyramid on Egyptian soil; the Step Pyramid at Sakkara was the blueprint for pharaonic splendour and inspired future generations to build even greater examples.

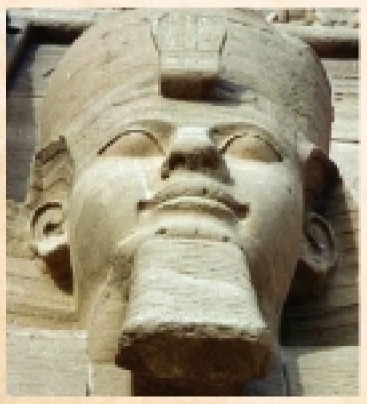
THE MIDDLE KINGDOM

Mentuhotep II 2061-10 BCE

The kingdom splintered after the prosperity and expansion of the Old Kingdom. This mini dark age of sorts was known as the First Intermediate Period and saw Egypt divided by two competing dynasties. Lower Egypt was controlled by the Tenth Dynasty and Upper Egypt by the Theban Dynasty. About 14 years into his reign, Mentuhotep II had grown tired of the stalemate and attacked the Lower Egypt capital of Herakleopolis. He eventually broke the rival dynasty, unified the two realms and effectively founded the era now known as the Middle Kingdom.

THE NEW KINGDOM

Ramesses II 1279-13 BCE



Tutankhamun may be the most recognisable pharaoh, but King Tut's reign was a speck of Egyptian sand compared the power, influence and achievement of Ramesses II. The third pharaoh of the 19th Dynasty, Ramesses II took an already prosperous kingdom and made it greater and grander than it had ever been. He expanded its borders, conquering Canaan and subduing everyone from the Nubians to the peoples of the Levant. He was also a prolific builder of monuments and temples, and even went as far as constructing his very own capital city, Pi-Ramesses.

Fourth Dynasty pharaoh Khufu oversees construction of the Great Pyramid of Giza

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Tomb art from the Old Kingdom

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THE OLD KINGDOM

A time of rebirth, the Old Kingdom saw the introduction of the first pharaoh, dynasty and pyramid to the world

Prior to the Old Kingdom, in an era known as the Predynastic, Prehistoric or Protodynastic Period, Egypt was going through something of a transformation. The nation was divided into colonies, each with their own lords and rulers. The north and south of the country were also very distinct in both practices and culture, with the city of Hierakonpolis the capital of the south and Bes the capital of the north.

Excavations over the last century have radically changed the way we view Egypt prior to the Old Kingdom, including the fact that the First Dynasty and the rise of Narmer was not an overnight process. Upper Egypt, the more affluent of the two states, had three main cities – Thinis, Nekhen and Naqada. One by one, these states conquered one another or merged, and by about 3100 BCE, Egypt emerged as one whole state with the warrior pharaoh Narmer at its head. Two dynasties followed this founding during a period known as the Early Dynastic Period, and it was here that the blueprint for the Old Kingdom was forged. Memphis became the capital and Abydos the religious epicentre. Even architecture and the arts began to approach the classical Egyptian form at this time. The Old Kingdom began in about 2686 BCE, with the formation of the Third Egyptian Dynasty. The term 'Old Kingdom' was introduced by 18th-century historians and is used broadly to signify the first of three peaks of Egyptian civilisation. Often referred to as the 'Age of the Pyramids', the Old Kingdom saw Egypt nurture every aspect that would make it great. From the Third Dynasty and its first pharaoh, Djoser, to the apparent last king of the Sixth, Netjerkare Siptah, the nation was transformed into a cultural and military powerhouse.

The pyramids are a symbol of this era, and the template for these monumental icons began in the reign of Djoser. His vizier and closest adviser, Imhotep (who would be deified in generations to come as a demigod and god of healing) was the architect behind the Pyramid of Djoser, and his designs were a significant leap in engineering in ancient Egypt. Prior to Djoser, kings were buried in rectangular, flat-roofed tombs called mastabas, but the Third Dynasty's founder desired immortality in death by means of a tomb worthy of a divine ruler. Imhotep's revolutionary design, stacking squared versions of mastabas on top of one another to create a pyramid, created the jewel

The Great Sphinx of Giza is believed to have been built in the time of Fourth Dynasty pharaoh Khafra

©Wiki / Thomas W

in the king's rebuilt kingdom. A grand necropolis, a symbol of the enduring Egyptian reverence for death, surrounds it, and the finished article would go on to inspire pharaohs for generations to come.

The grandeur of the Step Pyramid (the Pyramid of Djoser) at Sakkara wasn't lost on those who followed in Djoser's footsteps. By the time that the Fourth Dynasty kings were ruling over Egypt (2613-2498 BCE), a new set of pyramids were forming. The Fourth Dynasty is considered the 'golden age' of the Old Kingdom, the very peak of prosperity. The economy was thriving thanks to a peaceful realm and open trade routes with its neighbouring nations. As with every peaceful period of ancient Egypt, a spree of construction swept the nation.

> "The Old Kingdom boasted a strong centralised administration from the capital of Memphis"

Khufu, the second pharaoh of the Fourth Dynasty, was the man who created a monument so grand that it would eventually be named one of the Seven Wonders of the Ancient World: the Great Pyramid of Giza. Built over a two-decade period, the 146.5-metre-high structure was a feat of engineering that put even Imhotep's Step Pyramid in Sakkara to shame. Giza would become the site of many more pyramids and temples, known as the Giza Necropolis. The Giza Pyramid became the pinnacle of pyramid design in Egypt and it would remain the tallest man-made structure for a staggering 3,800 years. It served as a testament to the power of the pharaohs and the enduring potency of the many Egyptian gods.

The Fifth Dynasty of ancient Egypt (2498-2345 BCE) saw an evolution of theological practices across the entire nation, with certain cults growing in prominence (gods rose and fell in popularity, and usually those favoured by a particular dynasty or geographically important location were able to survive obscurity). The Cult of Ra (god of the noon Sun) and the Cult of Osiris (god of the afterlife) rose significantly in popularity during this period of time.

The Egyptian economy was also booming, with the influx of goods like ebony, gold, myrrh and frankincense growing all the time. The Egyptians pushed their trading boundaries even further with agreements with Lebanon and modern-day Somalia. In short, it was a time of enterprise without the fear of invasion or war.

This economic strength bled into the Sixth Dynasty (2345-2181 BCE), as did the growing popularity of the inscription of spells and incantations inside burial chambers and tombs. Known commonly as the Pyramid Texts, these inscriptions would form the basis of the *Book of the Dead.*

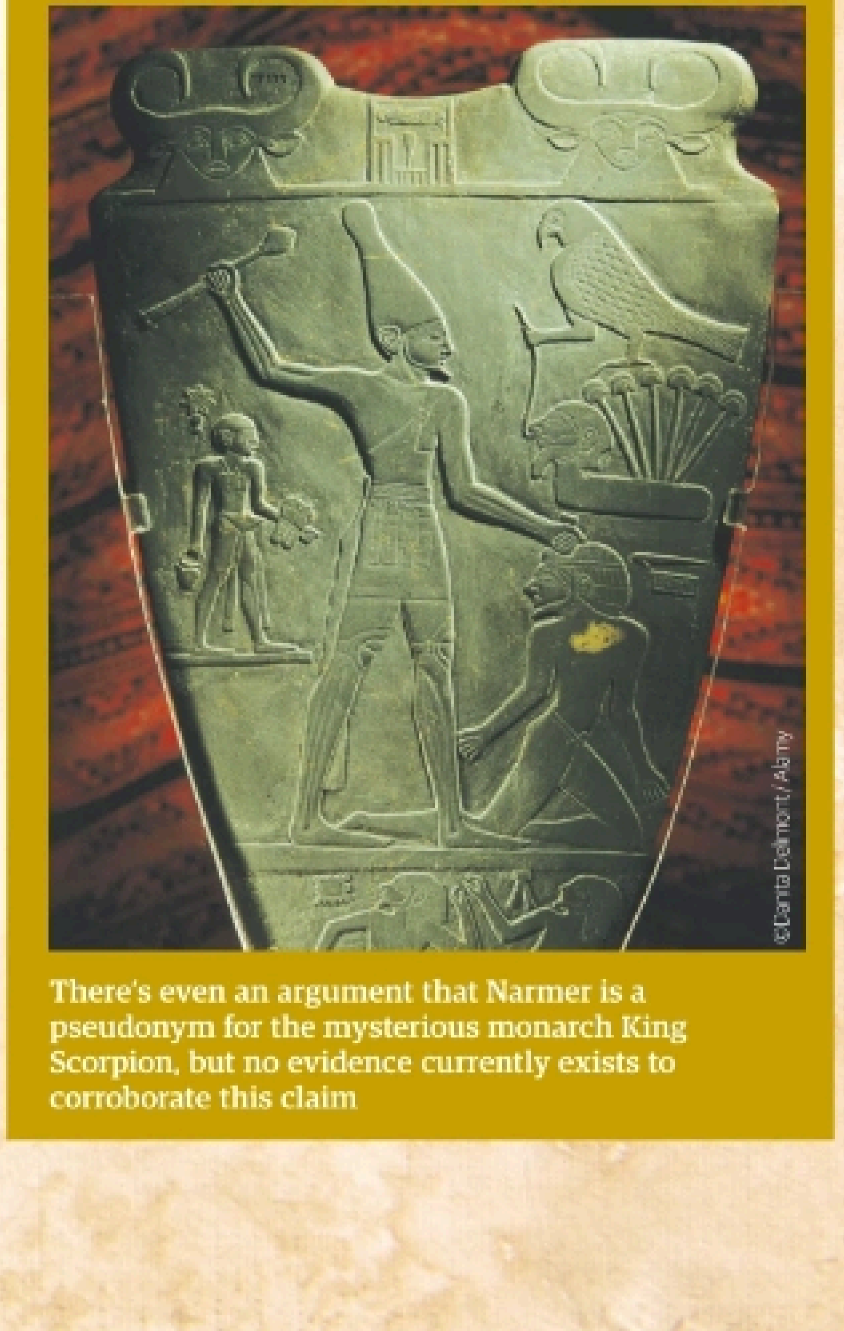
THE FIRST PHARAOH

Who was the man who unified two distinctly different halves of the same realm and set the stage for the Old Kingdom period?

The Old Kingdom was the first true age of prosperity and progress for Egypt, but it would have been nothing without the two dynasties that came before it and the man who founded the pharaonic line to begin with. That man was Narmer and, much like many of the leaders and radicals who changed history in the post-Neolithic world, he is a man steeped in myth, legend and mystery. Nevertheless, his actions and decisions at the beginning of the First Dynasty set the precedent for the 29 others that would follow.

Narmer ruled sometime during the 31st century BCE and became the first man to unite the states of Upper and Lower Egypt. Of course, for an event that happened so far back in prehistory, most of the information we have comes from references found in tombs and the conclusions drawn by Egyptologists and historians, but there are some intriguing details we can take from them.

Seal impressions found in tombs at Abydos linked to the pharaohs Qa'a and Den (both of whom ruled, to the best of our knowledge, after Narmer during the First Dynasty) cite a list of ancient kings that name Narmer as the first. There have even been stone vessels (elaborate vases) found in the Step Pyramid tomb of Djoser that pay tribute to Narmer, perhaps expressing an intended connection with the founder and his way of life. Some historians argue that a ruler by the name of Menes was in fact the founder of founders, while others theorise Narmer and Menes were one and the same.



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There's even an argument that Narmer is a pseudonym for the mysterious monarch King Scorpion, but no evidence currently exists to corroborate this claim

THE MIDDLE KINGDOM

Once again divided and once again whole, ancient Egypt rose from its own ashes to become a military and cultural powerhouse

For every period of greatness and monumental achievement in Ancient Egypt's history, there is a stretch of time where governments crumbled, territories divided and the nation fell into a dark lull. As the royal hold on the country fell apart towards the end of the Old Kingdom, Egypt was plunged into an era of uncertainty that is referred to as the First Intermediate Period.

To make matters worse, the power of the pharaoh was splintered when two rival dynasties began vying for power - the Tenth Dynasty (based in Herakleopolis, the principal city of Lower Egypt) and the 11th Dynasty (centralised in Thebes, Upper Egypt). This period of conflict and dissention lasted for 125 years, until the reign of Theban pharaoh Mentuhotep II.

Ascending to the Upper Egypt throne in 2055 BCE, Mentuhotep II watched as the Tenth Dynasty began to destabilise with in-fighting and regular riots. In his 14th year of regnal rule, the Theban king took full advantage of revolt and attacked Herakleopolis. By the time of his arrival, there was barely a battle to be had, and the city, and the rest of the region as a result, were taken. He quelled what little resistance could be offered by the remaining rulers of the decaying Tenth Dynasty then set about reunifying the kingdom as one.

Such a task was not quick; it took a staggering 21 years to bring the Lower and Upper regions into line. He began by conducting a series of military campaigns to regain the territories lost during the dark time of the First Intermediate Period. He travelled south to the Second Cataract in Nubia, a region that had gained independence from its masters. Mentuhotep II brought the Nubians to heel before restoring Egyptian authority in the Sinai region. It was a ruthless expression of military power in an era when authority was a long forgotten force.

His consolidation of power in Egypt and efforts towards unifying the nation ushered in what we now know as the Middle Kingdom, and that effort was continued by his son and successor Mentuhotep III. His rule was brief by pharaonic standards (a mere 12 years) but he further accelerated the unification, including an expedition to retake Punt (an old trading partner of Egypt). The throne then passed to Mentuhotep IV, whose reign remains something of a mystery. His name is often omitted from lists of kings found in tombs through the Middle and New Kingdoms, suggesting his rule was a short one and ended abruptly.

The Turin Papyrus (otherwise known as the Turin King List) is one such document; it describes the period following Mentuhotep III's death as "seven kingless years". Information regarding the 'missing king' remains scarce, but some details suggest a coup may have taken place. Records found at Wadi Hammamat, then a large mining region, attest to his reign and to expeditions to quarry stone for monuments. The records name a vizier, Amenemhat, as its commander. Whether or not this is the same Amenemhat that would eventually assume the throne, we cannot know for sure. However, it certainly seems likely.

So began the next dynasty, with Amenemhat I at its head. He began by moving the capital

Rock tombs of Beni Hasan, an ancient Egyptian burial site primarily used during the Middle Kingdom

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Ancient Egyptian men building a wooden coffin in a Middle Kingdom carpentry shop

© National Geographic Image Collection / Alamy back to Memphis (the capital during the Old Kingdom), as well as forming a standing army – an asset his successors would maintain for the rest of the dynasty. The new king began fortifying the country's borders, especially those between Egypt and Asia, where he erected the Walls of the Ruler in the East Delta. In fact, Amenemhat I rebuilt or built new fortifications all around Egypt, transforming the ancient nation's military strategy from expansion to simple territorial defence.

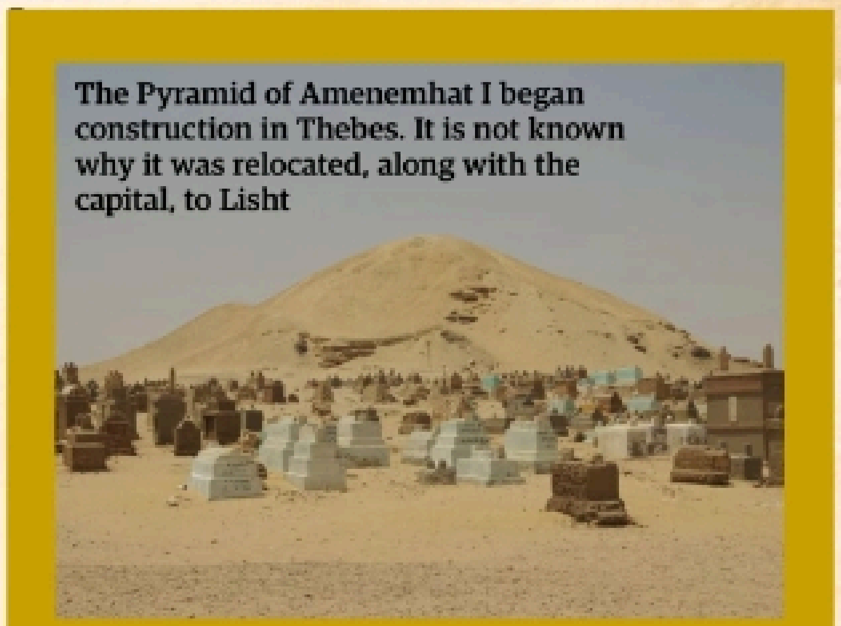
Amenemhat I would eventually begin a co-regency with his son, Senusret, before the elder king was assassinated – supposedly by his own guards.

> "During the Middle Kingdom, the elevated flood levels of the Nile boosted agriculture and buoyed the economy"

His successor, now Senusret I, began a more expansive series of military campaigns before eventually entering a co-regency with his own son, Amenemhat II. His son enjoyed a relatively peaceful reign of his kingdom and eventually chose a traditional joint rule with his successor, Senusret II. The new pharaoh built good relations with his nomarchs and focused mainly on the maintenance of the realm, building a pyramid at el-Lahun as well as attempting to convert the Faiyum oasis into workable farmland.

Under the sole rule of his successor Senusret III, the Middle Kingdom enjoyed the peak of its power and influence. The new warrior king was unlike anything the era had ever seen before – he represented a mind-set from a long forgotten era, an aggressive hunger to expand the kingdom and conquer new lands. He moved a huge army north of the kingdom and attacked the Nubians relentlessly, punishing them into surrender before finally claiming considerable Nubian territories.

His successor, Amenemhat III, is famed for his radical approach to construction. He took advantage of the country's limestone and sandstone quarries like never before, beginning a huge programme of building that spread across the entire kingdom. Amenemhat's son, Amenemhat IV, has a poorly recorded rule but his successor, Sobekneferu, became the first recorded female Egyptian ruler in the country's history, although her reign lasted only four years.



The Pyramid of Amenemhat I began construction in Thebes. It is not known why it was relocated, along with the capital, to Lisht

THE FEUDAL GOVERNMENTS OF THE MIDDLE KINGDOM

In the Old Kingdom before it and the New Kingdom that followed, the pharaoh's rule was absolute. Priests, nobles and even the queen herself could act, with consent, on the king's behalf, but for the most part, the pharaoh answered to no one but the gods. However, that definitive rule came under threat when the Old Kingdom crumbled and splintered into two separate realms. With two dynasties now vying for power, the normal authoritative structure of the kingdom was in ruins.

Prior to the rise of the pharaohs, the entire country was divided into small administrative colonies known as nomes. Each nome had an appointed leader, or nomarch, and it was these independent city-states that the first pharaoh had to unite in order to establish Egypt as a single nation.

Even after unification, the nomarchs – 20 of whom were based in Lower Egypt and 22 in Upper Egypt – remained. However, they existed more as regional officials who would report directly to the royal court. As the country entered the First Intermediate Period, these nomes began to assume autonomy once again. By the time of reunification, new sole pharaoh Amenemhat I found these states unwilling to bend the knee entirely. The position of nomarch was considered hereditary (rather than being subject to the king's discretion), an issue made all the worse by marriages that created powerful alliances between multiple nomes. In order to maintain peace in the kingdom, Amenemhat was forced to agree to an alliance of sorts, creating a bizarre feudal system that lasted until the reign of Senusret III.

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THE NEW KINGDOM

The last great age of ancient Egypt was its grandest yet – an era of economic enterprise, domestic beautification and military expansion

Lasting from the 16th to 11th century BCE, the New Kingdom saw ancient Egypt transformed. Its kings and queens both looked ahead at the promising future of the realm and back in the hope of emulating the monarchs of the past. The empire was expanded by the swords of warrior kings, while the realm itself was rebuilt from the ground up by a new economic prosperity. This was ancient Egypt at its peak, as reflected in the resultant creative boom.

The New Kingdom was preceded by another fracture known as the Second Intermediate Period. Towards the start of the 16th century BCE, a small warrior tribe known as the Hyksos had begun settling in the fertile land of the Delta (a group of rivers and tributaries that led into the Mediterranean Sea). By the time the pharaoh in Thebes realised what was happening, it was too late. The Hyksos were fearsome warriors who used advanced weaponry – mainly cavalry, chariots and powerful compound bows – and who were comfortably settled. The 15th Dynasty was established and lasted for more than 150 years, but the Hyksos presence divided Egypt in two, with the invaders controlling Lower Egypt while the Thebans ruled Upper Egypt. Kings made many efforts to defeat the Hyksos, but the tribesmen were seasoned warriors and weren't so easily deterred.

It wasn't until the time of Ahmose I, the first pharaoh of the 17th Dynasty, that everything

"Mortuary beliefs developed during this era, leading to an influx of talismans and amulets for protection in the afterlife"

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changed. Having watched his family fail to banish the Hyksos, Ahmose I raised a huge army and met the Hyksos with unrelenting force. Over many years he pummelled the borders, slowly driving the Hyksos back. Eventually, the Theban pharaoh drove the occupying forces from his homeland and set about restoring Egypt to its former glory.

With Egypt unified, the 17th Dynasty's founder began an expansive series of military campaigns that added new territories to the realm while regaining lands lost in the Second Intermediate Period. These conquests brought new wealth into the economy – it re-energised the construction of temples and monuments and enabled Ahmose I to rebuild the decorated nation of old.

Ahmose I's desire to restore Egypt to its former greatness would be reflected in the actions of the kings and queens who followed. Amenhotep III rebuilt monuments, tombs and statues on a scale never seen before, solidifying the bubbling new culture of arts and expression.

Queen Hatshepsut was the first woman to take the title of pharaoh, and she helped nurture the country's economy, including expeditions to Punt and other trading posts. Thutmose III created one of the most impressive armies ever assembled by a pharaoh and used it to expand Egypt's borders with conquest after conquest. The 18th Dynasty was a time of achievement on multiple fronts, but like any age of success, there was also a catch.

That blip came in the form of Amenhotep IV, also known as Akhenaten. A religious zealot who despised the power of the Church of Amun (the patron god of the Theban kings), Akhenaten did not believe in the polytheistic practices that had defined Egyptian theology since the country's earliest times. He outlawed the worship of any god other than his chosen deity, Aten, and forced the country into massive religious upheaval.

The Amarna Period, as it would come to be known, only lasted 16 years, but the damage was already done. The upheaval was so universally despised that Akhenaten was branded the 'Heretic Pharaoh', even by his own son and future pharaoh Tutankhamun. His legacy was summarily expunged from many future histories and a course was set to bring Egypt back to its former glory.

The dynasty that followed pushed Egypt's prosperity to new heights. The most notable pharaoh of the period, Ramesses II, took the great armies formed by Thutmose III and weaved a military campaign that moulded Egypt into its most powerful form. He sired a considerable number of children (most of whom he outlived) and built a huge tomb and necropolis in the Valley of the Kings.

Like the 19th Dynasty, the 20th was also defined by the legacy of one man: Ramesses III. However, while Ramesses II would strengthen his nation, his descendent would ultimately weaken it by draining the treasury with unsuccessful military campaigns. It was his mismanagement that eventually set about the slow decline of the New Kingdom and the native pharaonic line as a whole.

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WHAT HAPPENED NEXT?

Following the end of the New Kingdom and its final golden age, what was next for this ancient civilisation?

While the period we have come to know as ancient Egypt officially ended with the death of Cleopatra VII and its addition to the Roman Empire in 30 BCE, its true demise could actually be attributed to the death of Ramesses XI. The span of time that followed, the Third Intermediate Period, saw the power of the pharaohs start to deteriorate as political in-fighting took hold.

The period lasted about 350 years and was split into three stages: the first saw the rule of the country divided between the 21st Dynasty (which controlled Lower Egypt) and the High Priests of Amun at Thebes (which ruled most of Middle and Upper Egypt). The two states existed in relatively peaceful harmony. The second period saw the country reunited thanks to the rise of the 22nd Dynasty and new king Shoshenq I – the Libyan monarchy came to power in about 945 BCE, expanding out from the East Delta to control the entire nation. Once the country's bitter enemy, the Libyans now ruled Egypt as native Egyptians. The country began to destabilise once again under the rule of the 22nd Dynasty in 850 BCE, and by 818 BCE, a rival 23rd Dynasty had risen, which then caused the nation to fragment into warring states.

The country would eventually fall to a Nubian invasion, lasting 25 years. This marked a trend for the coming centuries as Egypt's grand native history was buried by an Assyrian, Persian and eventual Greek invasion during the subsequent Late Period. In short, the nation had fragmented so far from the stable centralised structure of the three kingdom eras that it ultimately benefited from the stability outside rule brought with it.

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Minoan and Mycenaean societies were centred around great palaces, such as the Palace of Knossos, serving as centres of social, military, religious and economic power

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THE BRONZE AGE AEGEAN

The arrival of metallurgy in the Aegean kick-started a period of unprecedented prosperity as formerly isolated islands began to trade with one another, exchanging not just goods, but ideas

Written by **Hareth Al Bustani**

The Late Neolithic Aegean was a simple place, a series of small, isolated communities scattered between Greece and Anatolia. Farmers lived peaceful lives, harvesting what barley and wheat they could, fishing in the Aegean and rearing domesticated animals. Dwellings were built of stone and tools were basic, fashioned of rock and bone, with cutting instruments forged from the black volcanic glass, obsidian. Society was egalitarian, ruled over by temporary leaders.

However, everything changed around 3000 BCE with the arrival of bronze tools, and weapons, most likely from Anatolia or Mesopotamia to the east. The early Bronze Age coincided with the arrival of Indo-European invaders, who at first laid waste to the Aegean before coupling with the indigenous populace, bringing with them an early version of the Greek language. In this new society, power was dictated by access to metal, and those who possessed the most emerged lifelong chiefs.

The ensuing metallurgic revolution sparked a remarkable period of artistic, economic and social growth across the Cyclades – a group of 30 islands in the southwestern Aegean, centred around Delos, the holiest sanctuary of Apollo. Boasting an abundance of copper, the Cycladic islands were at the eye of the storm of the Aegean's propulsion into the Bronze Age.

In the absence of surviving settlements, archaeologists have come to understand the early Cycladic Bronze Age via grave sites. The varying number, and quality, of goods buried with the dead indicates there was a significant disparity in wealth, and an established social hierarchy across the islands.

Though tin was in scant supply, Cycladic metalworkers either learned to alloy copper with arsenic, or worked with copper ores that were naturally rich in arsenic – some finished pieces featured up to four per cent arsenic. This alloying allowed them to practice forging, cold-hammering and hot-working, producing scores of daggers, axes, sickles, swords, spearheads and other weapons and tools, perhaps even through the use of a bivalve mould.

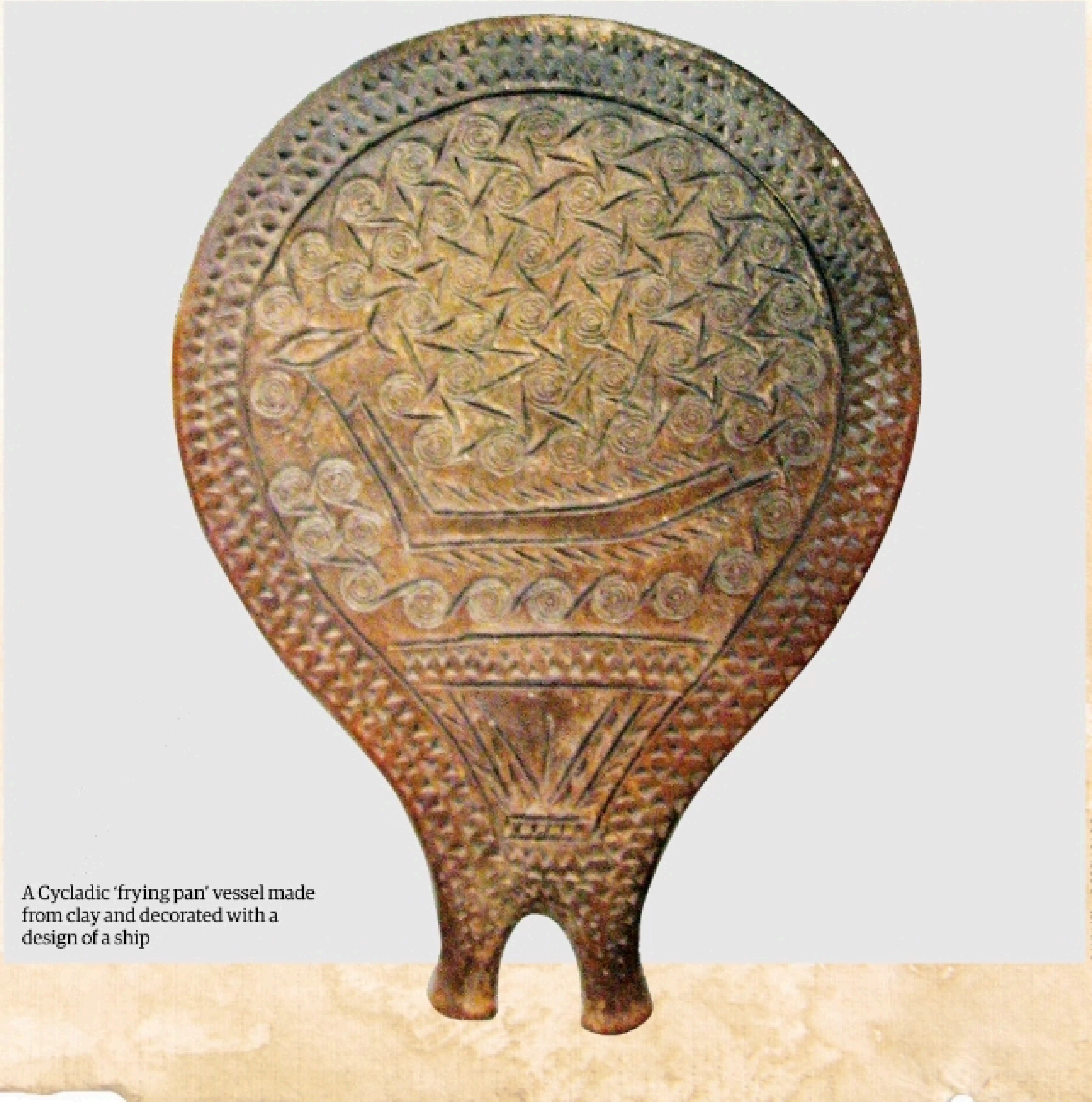
Beyond such utilitarian devices, the Cyclades were filled with an abundance of crafts and wares as its people embraced the arts with a passion hitherto unknown. The earliest Bronze Age pottery was simple, burnished with incised or stamped patterns of zig zags, triangles, spirals and lines, intersecting one another. With a discerning eye, they developed the iconic 'frying pan' vessels, which may have served a ritualistic or symbolic purpose, and were sometimes adorned with abstract female genitalia.

However, the most magnificent works of Cycladic art were its marble statues, usually depicting the female form. These ranged from simple stones with minor alterations to detailed figures boasting idealised sexual characteristics in all their fertile glory – between 20 centimetres high to almost life-sized. The most instantly recognisable of these depicted women with their arms either folded over their chest, or belly, which was sometimes swollen to indicate pregnancy. They were produced with great consistency, suggesting the use of a compass, and often painted with mineral-based pigments, such as azurite for blue and iron ore or cinnabar for red. One set, found in Keros, depicts a standing flautist and a seated harpist, demonstrating a cultural appreciation for art, proportion and design.

With their newfound grasp on metal, the Cyclades suddenly found their world a little larger as they began to export metal wares, and then ore, to their neighbouring islands. Naturally, the various formerly self-sufficient communities also underwent a cultural exchange. As they embarked upon widespread shipbuilding, the Cycladic statues found their way to the mainland as well as Crete where, by 1900 BCE, the Minoan civilisation had entered a golden age of its own.

Though Crete had been inhabited since 7000 BCE, it had since grown from a collection of small villages to a network of larger polities, anchored around spectacular palaces, such as the Palace of Minos at Knossos. This stone and mud marvel was not only a centre of power and wealth, but a projection of majesty, built around a

Artefacts from the Bronze Age Aegean often feature lively decoration inspired by nature, like the octopus on this vase



A Cycladic 'frying pan' vessel made from clay and decorated with a design of a ship

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Reaching their peak in around 1500 BCE, the Mycenaeans took quickly to metallurgy, with exceptional command of precious metals, as evidenced by their regal death masks

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HOMER'S BRONZE AGE

In Homer's literature, the *Iliad* and the *Odyssey*, the Trojan War is an epoch-defining event that marks the twilight of an era in which gods and superhumans mix, and heroes duel to the death. While some characters wield iron, most brandish armour and weapons of bronze. Given that the Aegean's first iron blades were imported from the east around 1200 BCE, Homer's Trojan War is most likely set during the Late Bronze Age.

The ancient bard describes bronze in magnificent detail in his works, and is clearly in reverence of its marvellous properties. One scene describes King Agamemnon dressing in a suit of "gleaming bronze", before picking up two bronze-tipped spears. Homer writes: "The glare flashed off their brazen points and pierced the high skies – and awestruck at the sight Athena and Hera loosed a crack of thunder, exalting the great king of Mycenae rich in gold." The Trojan prince Hector, meanwhile, wears bronze armour "aflash like lightning flung by Father Zeus with his battle-shield of thunder".

Homer also describes the use of bronze in the palaces of Alcinous, Menelaus, Zeus and Hera. It comes to take on not just a practical use, but a religious one, beckoning the power of the gods themselves – a fitting tribute to a material that gave birth to the Greek world.

Homer's epics, the *Iliad* and the *Odyssey*, describe bronze armour and weapons in magnificent detail, attesting to the metal's seemingly supernatural properties

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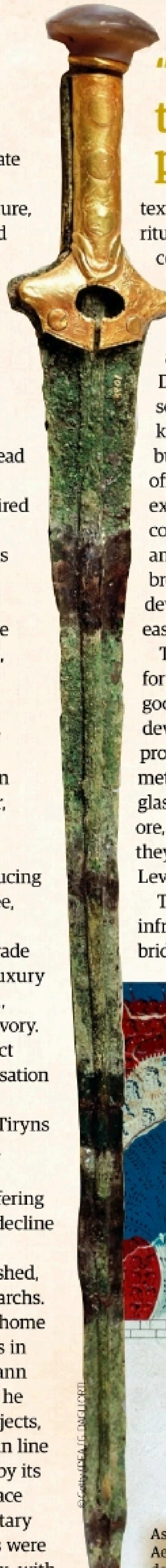

When metal arrived from the east around 3000 BCE, it did not take long for the Aegeans to recognise its superiority over existing materials, such as bone, stone and obsidian

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central paved court and featuring elaborate masonry. Walls and floors were painted bright colours, depicting scenes from nature, rituals and daily life. Superior houses and palaces even featured spacious living quarters, sanitary facilities, and better lighting and ventilation. Palaces also served as centres of ritual, though most significant religious activities were held at cult sites like springs, caves and sanctuaries as well.

The palaces developed a culture of record keeping, which spawned widespread literacy, with two main scripts. The first was a set of hieroglyphics, probably inspired by its Egyptian counterpart, and the second was a linear script, which remains untranslated. Both were used to keep administrative records on sundried clay tablets and adorned ritualistic objects like miniature axes and stone libation tablets, as well as pottery and jewellery. Like the Cycladic people, the Minoans displayed a passion for the arts, producing bright frescoes, painted vases and sculptures, all showing youthful men and women with long flowing, curly hair, dripping in jewellery.

For the next 500 years, the Minoans enjoyed an explosion of prosperity, producing exquisite granulated jewellery and filigree, demonstrating a remarkable grasp of advanced metallurgical techniques. As trade flourished, they exported food, timber, luxury goods and olive oil, while shipping in tin, copper, gold, silver, precious stones and ivory. This outward reach brought it into contact with the Mycenaeans, an emergent civilisation centred around strongholds across the Peloponnese, such as Mycenae, Thebes, Tiryns and Athens. Unfortunately, by 1500 BCE, as the mainland fell under the spell of Mycenaean culture, so too did Crete, suffering widespread destruction and falling into decline soon after.

As the greater Greek population flourished, its warrior chiefs soon evolved into monarchs. Homer would later declare Mycenae the home of King Agamemnon, who led the Greeks in the Trojan War. When Heinrich Schliemann unearthed Agamemnon's palace in 1874, he discovered vast quantities of valuable objects, indicating a magnificent level of wealth in line with Homer's own description. Inspired by its Minoan counterpart, the Mycenaean palace was the centre of religious, political, military and economic power. Numerous workers were employed throughout the palace complex, with men serving as metalsmiths, leather workers, carpenters and potters, while women produced textiles. At its heart was the megaron, a ritualistic centrepiece, where feasts and councils were held, and dignitaries received.

"The Minoans displayed a passion for the arts, producing bright frescoes, painted vases and sculptures"

The Palace of Nestor was one such place, ruling over the Kingdom of Pylos, a feudal realm of some 200 villages and towns, sprawling 1,400 square miles. Discovered by Carl Blegen in 1939, the palace served an elaborate hierarchy, topped by the king, then the commander, followed by a bureaucracy of military and administrative officials. The king, or wanax, was a warrior, expected to personally lead his army into combat as required, wielding bronze swords and daggers. His men would fight with bronze-tipped spears, bows and arrows, even developing a deadly Mycenaean version of the eastern chariot.

The Mycenaeans would dominate the region for the next 400 years, importing more luxury goods than ever before. In this time, they developed their own tradition of metallurgy, producing jewellery and vases of precious metals, as well as pottery, carved gems and glass ornaments. As they imported raw metal ore, they exported their wares to Crete, and they even reached as far as Spain and the Levant, filling vases with olive oil and wine.

This cultural boom unveiled itself in infrastructural marvels, with magnificent bridges, staggering fortification walls and advanced drainage and irrigations systems. Like the Minoans, the Mycenaeans had their own script, Linear B, which documented an early Greek language. The two cultures also shared certain religious rituals, incorporating music and dance into their worship while sacrificing animals at sacred outdoor altars. Mycenaean frescoes, vases and rings seem to depict the same goddess who adorned Minoan art, perhaps an archaic Aegean mother goddess of fertility.

However the Mycenaeans also prayed to the later gods, such as Zeus, Hera and Poseidon. Bronze played an important ritualistic role, incorporated into sites such as the Tomb of Agamemnon and the Treasury of Minyas, and workshops were often found close to temples. The cult of Zeus also used bronze at its ceremonies of the sacred oak tree at Dodona, where ritualists would interpret divine will using the sound produced by bronze cauldron-tripods – with bronze essentially acting as the voice of prophecy, and Zeus himself.

Unfortunately for the Mycenaeans, they also shared the Minoans' fate. By 1300 BCE, like Crete, the Greek mainland suffered widespread destruction, perhaps invaded by the Dorians, dispersing the Mycenaeans from their palace heartlands into more isolated settlements. As their palaces were destroyed, their economy fell into ruin, ushering in a Dark Age of anarchy, exodus and alienation.

As metallurgy spread across the Aegean, Minoan culture thrived, developing a passion for music, dance, jewellery and crafts, celebrated in colourful frescoes

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The great empires of the Levant and Anatolia formed a cultural bridge between East and West, allowing goods and ideas to flow across the entire Mediterranean

tty/DEA/M SEEMULLER

PIONEERS OF THE LEVANT AND ANATOLIA

Daring to tread where none had before, the metal workers of Anatolia and the Levant sparked a regional sociological and cultural transformation that would soon sweep across the world

Written by Hareth Al Bustani

The people of Anatolia began experimenting with metal as far back as 10,500 BCE, using chunks of malachite to create pigments and ornaments, before going on to mine and cold-work copper into tools in the 8th millennium. However, Anatolian metallurgy truly took off in the 7th millennium, with the advent of smelting, heating and hammering natively sourced copper into beads and decorative objects.

Meanwhile, in the late Chalcolithic southern Levant, people began crafting goods in gold and electrum. Utilising lost-wax casting, they used simple open moulds to produce axes, chisels and awls from unalloyed copper, while crafting alloys by combining arsenic-rich copper ore with those abundant in nickel or antimony. Early attempts at smelting were inefficient, producing viscous metal, which left much of the produce stuck in the slag. By the 4th millennium, however, the Levantines had developed the smelting process into a fine art, totally liquifying the mineral matrix and separating copper from slags, using new fluxing and reducing agents. Copper was mined at various local sites, like Aqaba in Jordan, and alloyed with arsenic. The Levantines used crucibles to re-melt, purify and cast copper, and soon split copper production into three proto-industrial stages; production, purification and alloying.

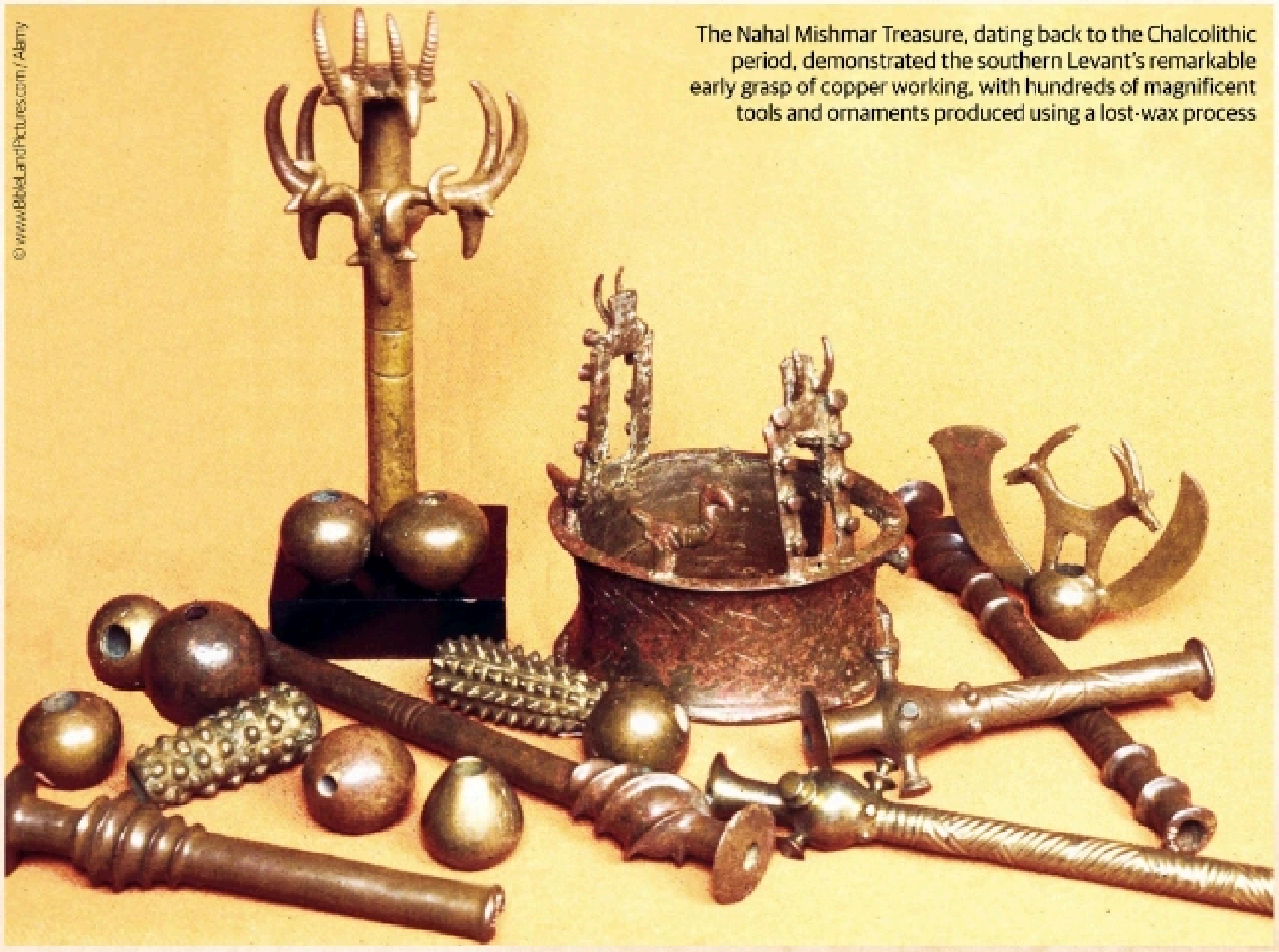
The Nahal Mishmar Treasure, 442 different objects wrapped in a straw mat and tucked into a crevice near the Dead Sea, contained 429 copper objects, alongside various other valuables – perhaps relocated from a nearby shrine during an emergency. While tools were made from pure copper, mined in the Sinai Peninsula, the more advanced objects were alloyed with four to 12 per cent of arsenic, producing a harder substance that was more easily cast. Produced in around 3500 BCE, the hoard attests to the role that metalwork played in a culture centred around cultivating olives and dates, domesticating animals, and producing magnificent paintings, terracotta figurines, ivories, bowls and sculptures. Greatly outnumbered by flint tools, decorative alloyed artefacts like sceptres and mace heads become symbols of prestige.

Metallurgy was boosted by the domestication of donkeys, allowing ores to be transported from greater distances. This led to increasing urbanism as rival mercantilist centres blossomed, governed and exploited by elites whose control over metalsmiths or resources gave them immense power. As villages grew into towns and then cities, uniformity spread across the region, expressing itself in consistency of architecture and social structure, all along the 'Byblos run' linking Egypt with Asia. While Ugarit continued to thrive in the north, the southern Levant peaked in around 2400 BCE before collapsing and regressing once again to village life.

Regardless, their superior techniques had already spread across the world, as far as the Nile Delta, and even the Caucasus, via the Euphrates. In Susa, in modern Iran, the proto-Elamites replaced their crucible smelting techniques with furnace metallurgy and adopted Levantine lost-wax casting. Susa was renowned for its jewellery, with silver pendants adorned with hematite, gold, beads and sometimes small doves, while little golden pendants were shaped like dogs. As they began shipping in tin from Central Asia and alloying it with copper, they treated the resultant bronze as a precious metal, using it to create vessels and ornaments. Copper, meanwhile, was used to produce weapons, like axes and daggers, and tools, from adzes and chisels to shovels and scales. Susa imported its tin from central Asia, part of a metal trade route that also carried gold and lapis into Mesopotamia.

> "Elites acquired copious amounts of metal from afar"

Boasting an abundance of natural resources, by the early Bronze Age, Anatolia enjoyed a high level of urbanisation in super-settlements such as Troy in the northwest and Alaca in Central Anatolia. Cities like Troy were fortified, with two huge gated ramps, containing numerous streets and houses built around central courtyards, complete with workshops and cult rooms. These continued to grow in scale and diversity, with each polity governed by a central hierarchy.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The Nahal Mishmar Treasure, dating back to the Chalcolithic period, demonstrated the southern Levant's remarkable early grasp of copper working, with hundreds of magnificent tools and ornaments produced using a lost-wax process

© NTERFOTO / Alamy

ABOVE: A Phoenician ivory sculpture of a woman playing a drum, found in Ras Shamra and dating to the 13th or 12th century BCE

Nestled on the Hellespont, the Anatolians not only dominated the Black Sea and Balkans, but also formed a bridge between east and west. Elites acquired copious amounts of metal from afar, and cities like Troy and Alaca, which hoarded far more than their neighbours, presided over regional hierarchies. Controlling access to metals gave them a monopoly over not only knowledge, but prestige. Bronze alloys created from tin, which had to be imported from Afghanistan or central Europe, came to symbolise particular status, given its distinct appearance.

The palatial workshops of Troy crafted magnificent jewellery using advanced casting and miniature techniques, and, evidence of their growing reach, exported tools and the unique depas tankards to the Aegean, central plateau and Cicilia. In turn, they adopted the innovative Levantine slotted spearhead, as well as the north Syrian fast potter's wheel, using it to mass produce red-wash vessels.

However, towards the end of the Early Bronze Age, Anatolia suffered widespread destruction, at the hands of technologically inferior but numerically superior cultures. Chief among the invaders were the Hittites, Indo-Europeans who descended upon Anatolia, raiding, sacking and burning down settlements as they made their way across the region. They settled in the Kingdom of Hatti – the strongest of Anatolia's various realms, bounded by the Marassantiya river to the east – adopting the local civilisation and religion. Amid the growing instability, the Assyrians pulled out of the region, leading to a breakdown in order and a power vacuum.

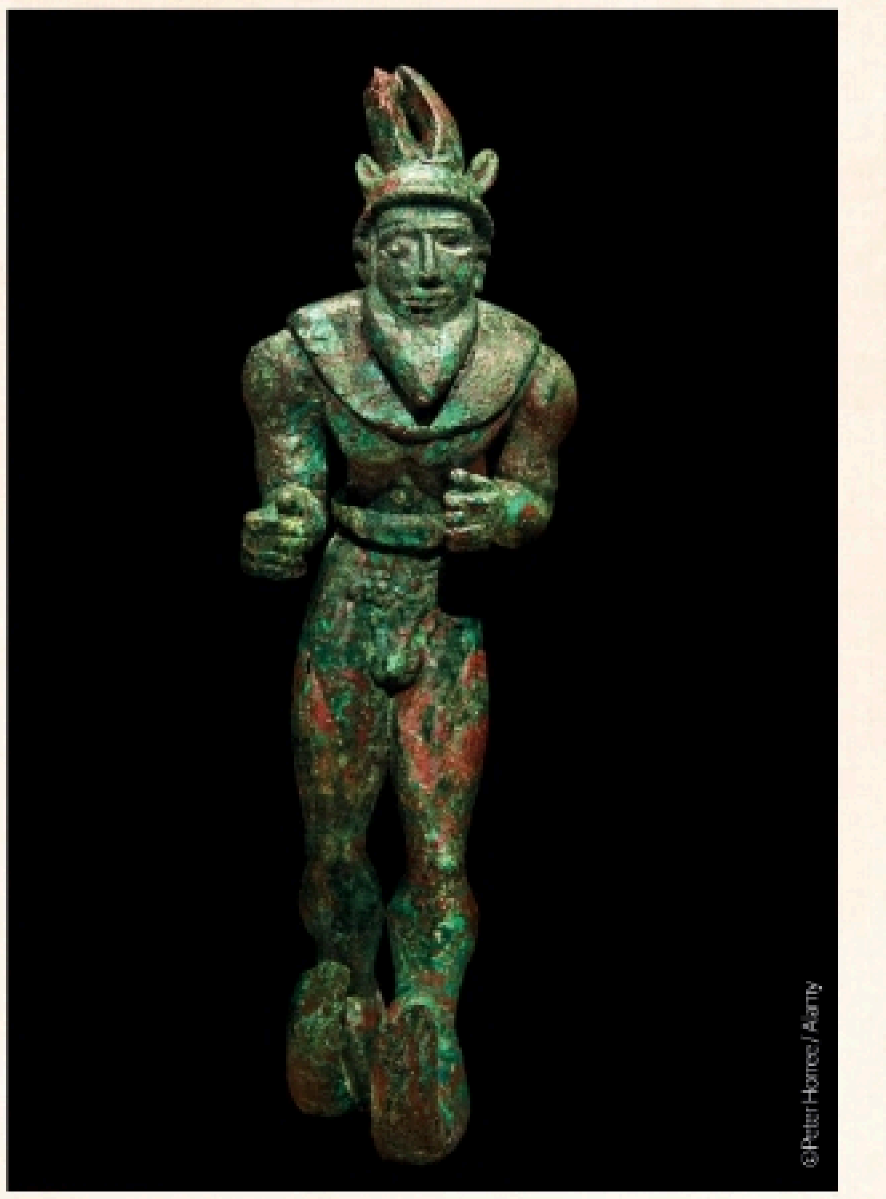
In the 18th century BCE, a Hittite 'Great King' called Labarna emerged from his petty kingdom of Kussara, based in the city of Nesa, subjugating and destroying numerous enemies, until half of Anatolia was under his command. Thus, the Hittite Old Kingdom was born. Though the Hittites spoke an Indo-European language called Nesili, they ruled over a diverse land, keeping records in eight languages. In 1650 BCE, King Hattušili I made the city of Hattusha his capital, fortifying it with walls and gateways, before launching another raiding campaign into Syria and Mesopotamia.

While Hattušili plundered all the way to Aleppo, his grandson wiped out the Syrian kingdom of Yamhad and sacked Babylon, only to be assassinated upon his return – plunging the kingdom into chaos. Plagued with weak rulers and infighting, Hatti's problems were magnified when the Gashga people came plundering from the Pontic Alps, destroying the capital. Sensing an opportunity, the Egyptian Amenhotep III signed a treaty with the Hittites' western Anatolian enemy, a confederation of kingdoms known as Arzawa.

Meanwhile, a rival group, the Hurrians, settled across Mesopotamia, Syria and eastern Anatolia. Aggressively expansionist, they made a dramatic entrance onto the stage of history in around 2200 BCE as members of the Akkadian Empire, shortly before its fall. Following the collapse of the Ur dynasty, by the 16th century, the various Hurrian mini-states were amalgamated and gobbled up by the emerging Kingdom of Mitanni, governed by an Indo-Iranian elite. As they made clients of the kingdoms of northern Syria, the Mitanni grew into one of the region's great powers, swelling up against the Hittite border. The two would wage constant war, stealing away vassals, plundering and even destroying one another's capitals – it was a war that could only be won with the other's complete and utter annihilation.

Although Egypt's Thutmose III asserted his might over the Mitanni, they soared to new heights under the rule of the 15th-century ruler Shaushtatar, who sacked the Assyrian traditional capital of Ashur, sweeping west towards the Mediterranean coast. Egypt would later ratify their holdings north of Kadesh, on the Orontes river, and Amurru and Ugarit on the coast. The Mitanni produced and exported iron, with Tusratta sending Amenhotep III a sacred iron dagger

> "The Mitanni grew into one of the region's great powers, swelling up against the Hittite border"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ABOVE: Southern Levantine metalwork technology and methods spread as far as the proto-Elamite capital of Susa, where, with tin imported from Afghanistan, smiths treated bronze alloys as a precious metal

© North Wind Picture Archives / Alamy

At the 13th Century Battle of Kadesh, the Hittites held their own against the Egyptians, forcing them to recognise the Anatolians as equals

Having served as a bridge between east and west, the Phoenicians greatly influenced Greek civilisation, from science, literature and governance, to the alphabet itself

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covered in 340 grams of gold with a haft in lapis lazuli. Amenhotep IV, meanwhile, received ten iron rings covered in 30 shekels of gold, which was most likely procured from Egypt.

The Hittites' fortunes were restored by the mid-14th-century-BCE king Šuppiluliuma I, who pacified the north, took back the capital and then crossed over the Euphrates. With the Mitanni now consumed by infighting, Šuppiluliuma stole all of their Syrian allies before going on to plunder their capital of Wassukkani, eventually dismantling the kingdom. The campaign culminated in the capture of the city of Carchemish, whereupon the Mitanni king Tushratta was assassinated by his own son. Šuppiluliuma's successor went on to subjugate Arzawa.

Hittite armies were centred around infantry and charioteers, the latter drawn from the upper classes. Chariots were manned by three men, wielding composite bows and thrusting spears that were used to punch holes in enemy lines, allowing infantry to swoop in with bronze sickle swords and battle axes and pick off the shell-shocked defenders. The Hittites amassed a staggering 3,700 chariots and 40,000 soldiers for the Battle of Kadesh in 1274 BCE. Successfully denying the Egyptians a decisive victory, the Hittites pushed them into signing the world's first peace treaty in 1258 BCE, recognising the Hittites as their equal.

Inheriting a mineral-rich region with a tradition of metallurgy, the Hittites crafted armour, weapons, tools, figurines and novelties, such as silver deer-shaped drinking horns and fist-shaped vessels. Smiths practised a wide variety of shaping techniques, from chasing and filigree to granulation, along with various methods of gilding, repoussé and brazing. They inscribed plates with hieroglyphics, and decorated them with images of griffins, trees of life, violent scenes of nature and hunting expeditions.

Tools, weapons, figurines and cosmetic instruments were cast and hammered. One bronze spearhead bore the name of King Anitta, while a sword was dedicated to the god Nergal. Another blade commemorated Tuthaliya II's victory over the western Assuwa confederation, while axes bore reliefs of real and fantastical beasts, against a smooth background. Even treaties, such as that between Tuthaliya IV and Kurunta, king of Tarhuntassa, were cast in metal. One text refers to a valuable dagger, with "its front shimmering and a pommel of rock crystal". Inventories list silver and gold necklaces, copper bathtubs, cymbals, pins, gold pendants, beads and garments decorated with gold and silver accessories - demonstrating a clear abundance of wealth. Anitta, the king of Kuššara, was even gifted an iron throne.

However, with the Mitanni gone, the Assyrians grew ever stronger and the Hittites found themselves beset by violence on all fronts. As the west spontaneously crumbled, the Assyrians attacked from the east. By 1200 BCE, Hattusha had been destroyed, and the Hittites were torn

THE KINGDOM OF UGARIT

First settled in the Early Palaeolithic, by the Neolithic era, the northwest coast of Syria was littered with farming villages. In the early Bronze Age, the village of Ras Shamra had developed its own metallurgical culture, producing bronze spearheads, daggers, flat axes, needles and jewellery. After being briefly abandoned at the end of Egypt's Old Kingdom, and the collapse of the Akkadian Empire, it flourished again with the arrival of various nomads, such as the Amorites.

By the 2nd millennium BCE, the village, some seven miles north of Latakia, blossomed into a port city, the heart of the most powerful Canaanite kingdom, Ugarit. Its strategic location at the nexus between the Egyptians, Assyrians, Hittites and Mesopotamians allowed the city to flourish financially, and culturally, as a trade hub at the heart of the Near East. In a time of great turmoil, it also provided an anchor of commercial stability. The city boasted its own west Semitic script, with mythological texts celebrating the chief deities of El, Baal and Anat. The king was believed to represent Baal on Earth.

While it remained an Egyptian vassal from 1400 to 1350, when the Hittite king Šuppiluliuma defeated the Mitanni, Ugarit soon became a subject of the Hittites instead. Though the city was wealthy, it lacked a military presence, and simply sent tribute in cash, rather than men. Soon after, the city was pillaged and destroyed, most likely by the Sea People, and eventually abandoned.

Having been inhabited for 6,000 years, the Ugarit capital of Ras Shamra grew into the Levant's omnipotent port city and trade hub, albeit one lacking military might

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As the Hittites busied themselves with their eastern enemies, the Mitanni, a group of anti-Hittite leaders in the western Anatolia banded together, forming the kingdom of Arzawa

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asunder, surviving only through isolated dynasties that had been left behind in a few royal holdings, such as Carchemish.

Back in the Levant, a new society had emerged from the ashes. While the northern Canaanite kingdom of Ugarit would soon collapse, the south's star was on the rise. Between Syria and the Mediterranean, along a coastline 100 miles long and just ten miles wide, bordered by the Lebanese mountains, a new civilisation had begun to thrive. Perfectly situated at the heart of the known world, by the 6th Egyptian Dynasty, the Levant's resource-poor cities had become the busiest and wealthiest trading hubs on the planet.

Rather than a unified country or empire, the Levant comprised a coalition of rival supercities - Tyre, Sidon, Byblos and Arwad - with their own spheres of influence. As the great Bronze Age powers of Ugarit, Hatti and Egypt collapsed around them, they were freed from the Egyptian yoke, quickly becoming the lords of the Mediterranean. With a tradition of metallurgical excellence, they manufactured weapons, tools, jewellery and ornaments. However, their master artisans were also accomplished in wood, ivory, enamel and glass. They came to master filigreeing, repoussé, gold sheeting and granulation, before perfecting iron smelting and ironwork by 1000 BCE, flowering alongside the Iron Age.

However, they were perhaps most famous for their magnificent fabrics, which were woven by the women of Tyre and dyed purple using molluscs - sometimes sold in powder form. The Greeks would later name the self-identified Canaanites the 'Phoenicians' after their iconic purple dye, which would go on to adorn the robes of emperors and kings the world over thanks to its rich hue. When they took to the seas in 1200 BCE, the Phoenicians did so in style, building enormous, groundbreaking vessels that were capable of hauling huge volumes of cargo over long distances. When even the Mycenaean civilisation fell, nothing could stand in the Phoenicians' way and they became the world's first true seafarers, pioneering the arts of pilotage, cargo transportation and navigation.

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ABOVE: The Hittites not only inherited vast resources, but a tradition of metallurgy, practising a wide variety of shaping, gilding, repoussé and brazing techniques

Phoenician ships set the new standard; 70-foot-long behemoths with long and narrow galleys, and a sharp point to cleave wind and water, rather than the traditional inward-curving bow. Large, rectangular sails were hoisted high above to ease the burden on the galley slaves rowing below. They invented the keel, the structural backbone linking the bow and the stern, as well as mortise and tenon joints, used to build sturdy hulls.

THE ENEMIES OF WESTERN ANATOLIA

When the Hittite Old Kingdom controlled central and eastern Anatolia, the kingdoms of the west joined forces to form the Assuwa federation. The Hittites invaded Assuwa in around 1430 BCE, and waged war on their western foe for three decades before finally emerging victorious. Having dismantled the alliance, they deported the Assuwan king and his son to the Hittite capital, along with 10,000 soldiers, 600 horses and numerous chariots.

The emergence of the Mitanni to the east created a grave and constant existential threat to the Hittites, once again relieving pressure on the west. In the Hittites' absence, a local leader called Uhha-Ziti brought together the region's leading powers to create the kingdom of Arzawa. Centred around the capital of Apasa, perhaps better known today as Ephesus in modern Turkey, Arzawa's influence stretched across western Anatolia. Shoring up support from other regional powers, such as 'Ahhiyawa' – perhaps a reference to part of the Mycenaean world – Arzawa came to be considered by the Egyptians as a great power.

However, once the Mitanni were finally destroyed, the Hittites turned their attention back west. In 1305, the Hittite King Mursili II marched into Arzawa, shattering its army on the Astarpa River, before besieging Apasa. As the Arzawan king Uhhaziti fled to the Aegean islands, Mursili stamped out any remaining resistance, swallowing the kingdom of Arzawa and splitting it into three, each ruled by Arzawan princes, loyal to him.

> "Soon, the whole Mediterranean was the beneficiary of Mesopotamian literature, astronomy, weights and measures"

Other innovations included the concept of maritime law, the standardisation of transportation vessels, and the crow's nest. They even discovered the North Star, which allowed them to not only sail at night, but to do so with greater accuracy, meaning that they could navigate the open seas. As they sailed further afield, they established colonies, bases and trading emporia across the Mediterranean, in Cyprus, Sardinia, Sicily, Iberia, Malta and North Africa, in Utica and Carthage. Their mastery even took them through the Pillars of Hercules and all the way down the east coast of Africa, discovering the Canary Islands and Cape of Good Hope.

As this trade network expanded, the Phoenicians imported cereals, wines and precious stones from the east; lead, gold and iron from the Black Sea; copper, cypress and corn from Cyprus; ivory from Africa and silver from Spain, before exporting it back across the world. They may have even sailed as far as the British Isles to acquire tin, and they obtained so much silver from the Iberians of Spain that they had to replace the iron and stones in their anchors with silver.

Aside from being innovative, they were brutal, enslaving the Iberian natives and forcing them to work the mines. These slaves extracted colossal volumes of silver, iron and copper, with even crude and recyclable metals stored in warehouses for export. While many of their colonies had already learned to produce copper, bronze, tin and gold, the Phoenicians taught them enhanced extraction and working techniques, utilising greater furnace technology. With battering rams attached to their magnificent ships, they also resorted to piracy, stealing cargo and enslaving crews. Sometimes, they might even lure natives aboard their ships, only to capture and haul them off into slavery. They mass produced wheel-turned pottery in Iberia and ships in Carthage, signed off with the Punic alphabet.

This enormous empire formed a cultural nexus between east and west – learning the arts and sciences of Egypt, Crete and the Near East, and dispersing them across Greece, Italy, Spain and Africa. Soon, the whole Mediterranean was the beneficiary of Mesopotamian literature, astronomy, weights and measures. After initially spreading Egyptian hieroglyphics, the Phoenicians created a new 22-letter script from the Ugaritic alphabet. Unlike its Mesopotamian and Egyptian counterparts, the Phoenician alphabet was easy to learn, and did not require a professional scribe to interpret or write. This democratised communication, streamlining contracts and correspondence, facilitating a greater transfer of high culture, and advancing mercantilism.

By 1100 BCE, the demand for record keeping had grown so great that the Mesopotamian tradition of heavy clay tablets had grown obsolete. Instead, Byblos, the oldest Levantine city and religious capital, imported and exported masses of papyrus – so much that the Greek's would later name paper 'biblos', a legacy reinforced by the Bible. While Sidon, 50 miles south of Byblos, was a fortified metropolis, the greatest of all was Tyre, boasting a cosmopolitan array of merchants and slaves. Each city worshipped its own patron deity, as ancestors to the kings and gods of fertility. At Byblos, women honoured Ishtar – the goddess of physical love, synonymous with the later Aphrodite – by either surrendering their tresses to her, or their virginity to the first prospective partner, within the temple. Meanwhile, children were burned alive as sacrifices to the terrible god, Moloch.

Asides from naming the North Star in Phoenicia's honour, the later Greeks would borrow many other words from the Phoenician lexicon. Phoenicia's alphabet itself would form the basis of the Greek, and hence 'Western', one. They also took inspiration from the Phoenician pantheon of gods, religious-sports festivals and athletic stadiums. The Phoenician polities, with councils of elders and peoples' assemblies may have even gone on to inspire the governments of early Greek city-states.

Having stepped into the shadow of the great empires of the Bronze Age, the Phoenicians would later usher in the empires of the future – living long enough to see the rise of the Greeks and the birth of Rome before being conquered, first by the Persians, who split the realm into four, and then Alexander the Great.

A gold bowl from Ugarit, dated to 1450-1365 BCE

© age fotostock / Alamy

SECRETS OF THE SOVIET SANDS

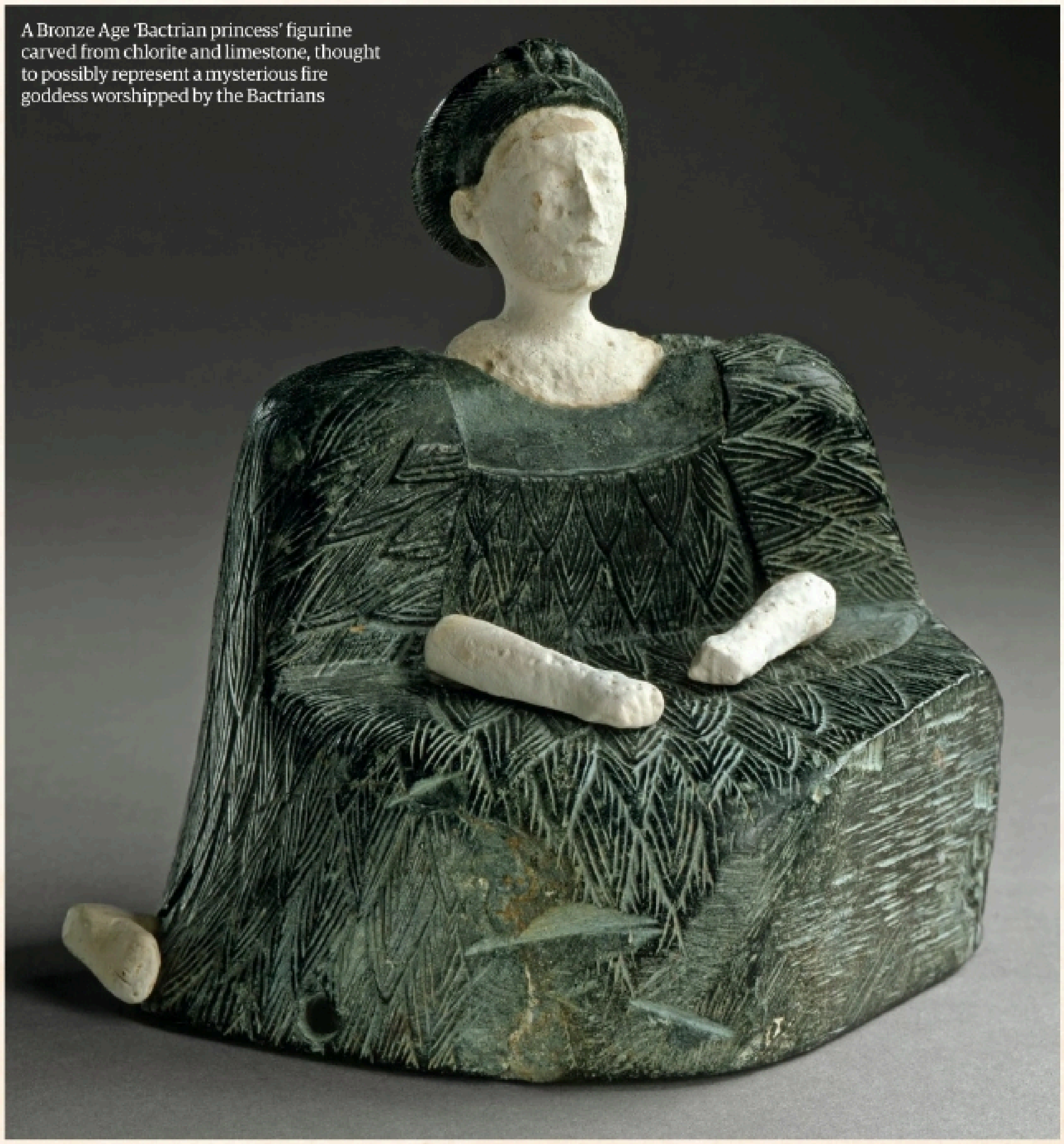
In the 1970s, an archaeologist from the USSR discovered the historical record of a Bronze Age civilisation in the Central Asian desert. Only the fall of the Iron Curtain would reveal his research to the wider world

Written by **April Madden**

History is full of surprises. When the Soviet Union collapsed in the late 1980s, the wider world was able to discover the work of Viktor Ivanovich Sarianidi, a Russo-Greek archaeologist from the Uzbek city of Tashkent. His research, hidden behind the Iron Curtain since the 1970s and eventually translated in the 1990s, revealed something startling: a largely unknown Bronze Age culture in Central Asia, with links to the civilisations of the Indus Valley, the cultures of the Iranian Plateau and Persian Gulf, and those of the Eurasian steppes.

The crossroads of Central Asia sits somewhere amid the dark sands of the Karakum Desert. The Karakum is a shifting, ever-expanding place; windborne particles of it have been found in locations as far apart as Antarctica and Greenland. The Silk Road once wove its way through the desert, past the "perfect lands" of the oasis city Merv (now Mary, Turkmenistan), and the glittering river city Āmul (now Türkmenabat). The Amu Darya river that runs along the northeastern edge of the desert is named for this ancient city, although in classical writings it's more commonly referred to as the Oxus. The lands beyond it were known to the Romans as Transoxania, to the Arabs as Mā Warāʾ an-Nahr, and to the Persians as Farârud – names that all translate to 'Beyond the [Oxus] river'. To the ancient Iranians the land beyond the river was Turan, a semi-legendary warrior-realm that is mentioned in the great Persian epic *Shanameh*.

In the 19th and early 20th century, Turan became a problematic concept. Traditionally the Turanians had been conceptualised as the 'opposite' of the Aryans – the name that the people of ancient Iran had given to themselves in their oldest Avestan-language scriptures. To them, the Turanians were outsiders and apostates, the dark to their light: they may not have followed the ancient Iranian religion of Zoroastrianism, despite

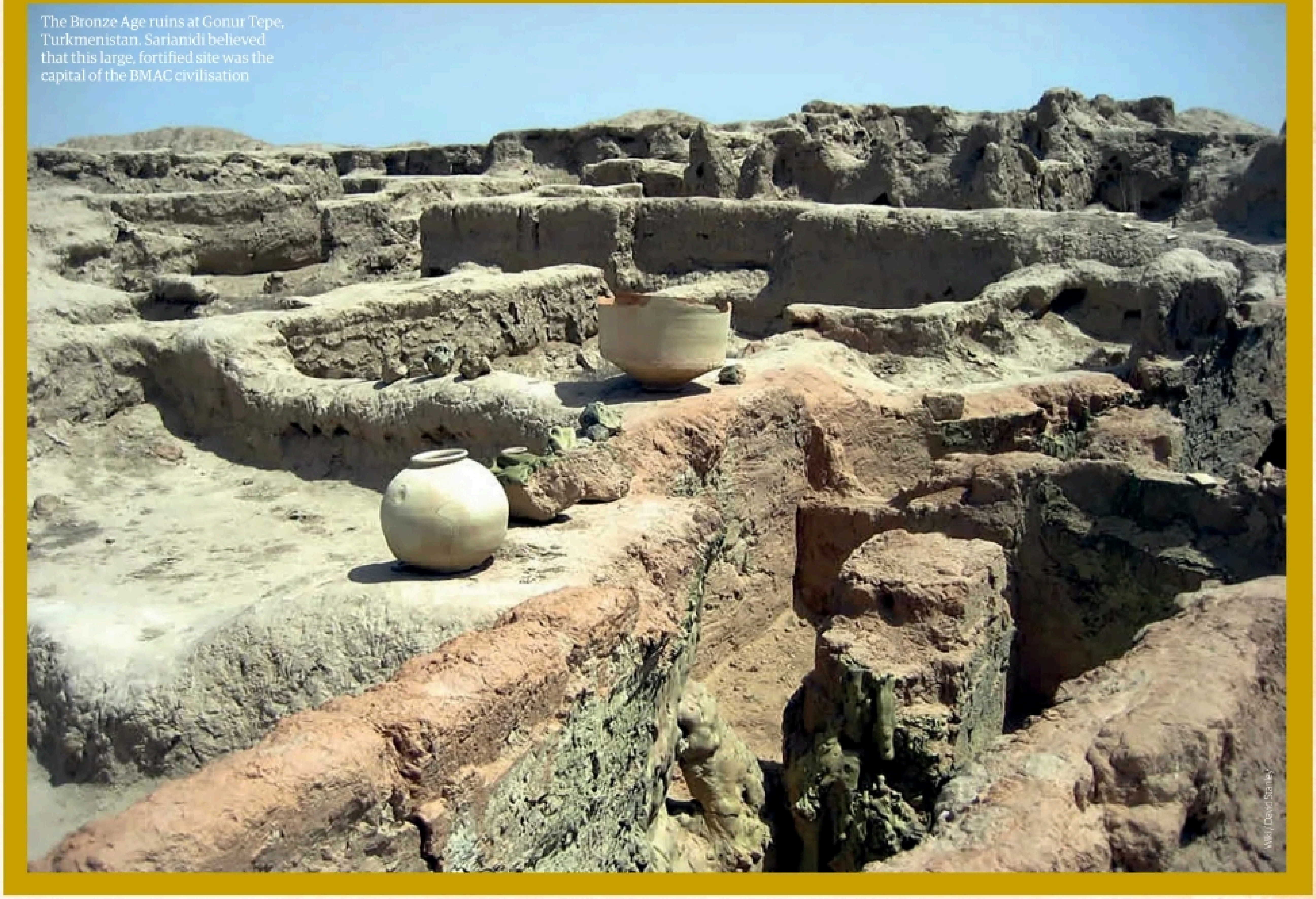


A Bronze Age 'Bactrian princess' figurine carved from chlorite and limestone, thought to possibly represent a mysterious fire goddess worshipped by the Bactrians

"The Bronze Age people of this region were settled, urbane, technically adept"

CAPITAL CITY?

Set like a jewel amid the irrigated fields that fed its (for the time) large population, the outlines of the town that Sarianidi called Margush and theorised was the capital of the BMAC can still be seen at the site of Gonur Tepe in Turkmenistan. Fortified behind walls and dominated by a 'qila' citadel (the word is Persian for 'fort', and the buildings are common to ancient Iran, Turkey, Azerbaijan, Afghanistan, Turkmenistan, India, Pakistan and even parts of Israel), this proto-city could have supported a population of thousands. Its streets were lined with adobe mudbrick houses, each containing several comfortable, reasonably spacious rooms apiece – the inhabitants certainly weren't crowded into low-quality, small homes. They had a water supply fed by a reservoir and not one but two sewage systems – Sarianidi theorised that one was for regular use and one solely for religious ritual ablutions, although this has been disputed by some Zoroastrian scholars. They have also disputed Sarianidi's assertion that he discovered a vast (he described it as "cathedral-sized") Zoroastrian fire temple at the site, within which were jars and other vessels containing traces of cannabis, opium and ephedra, now thought to be the components of an ancient drug mentioned in the Hindu Rigveda as 'soma' and in the Zoroastrian Avesta as 'haoma'. The site may well have been dedicated to an even earlier Indo-Iranian fire deity instead.



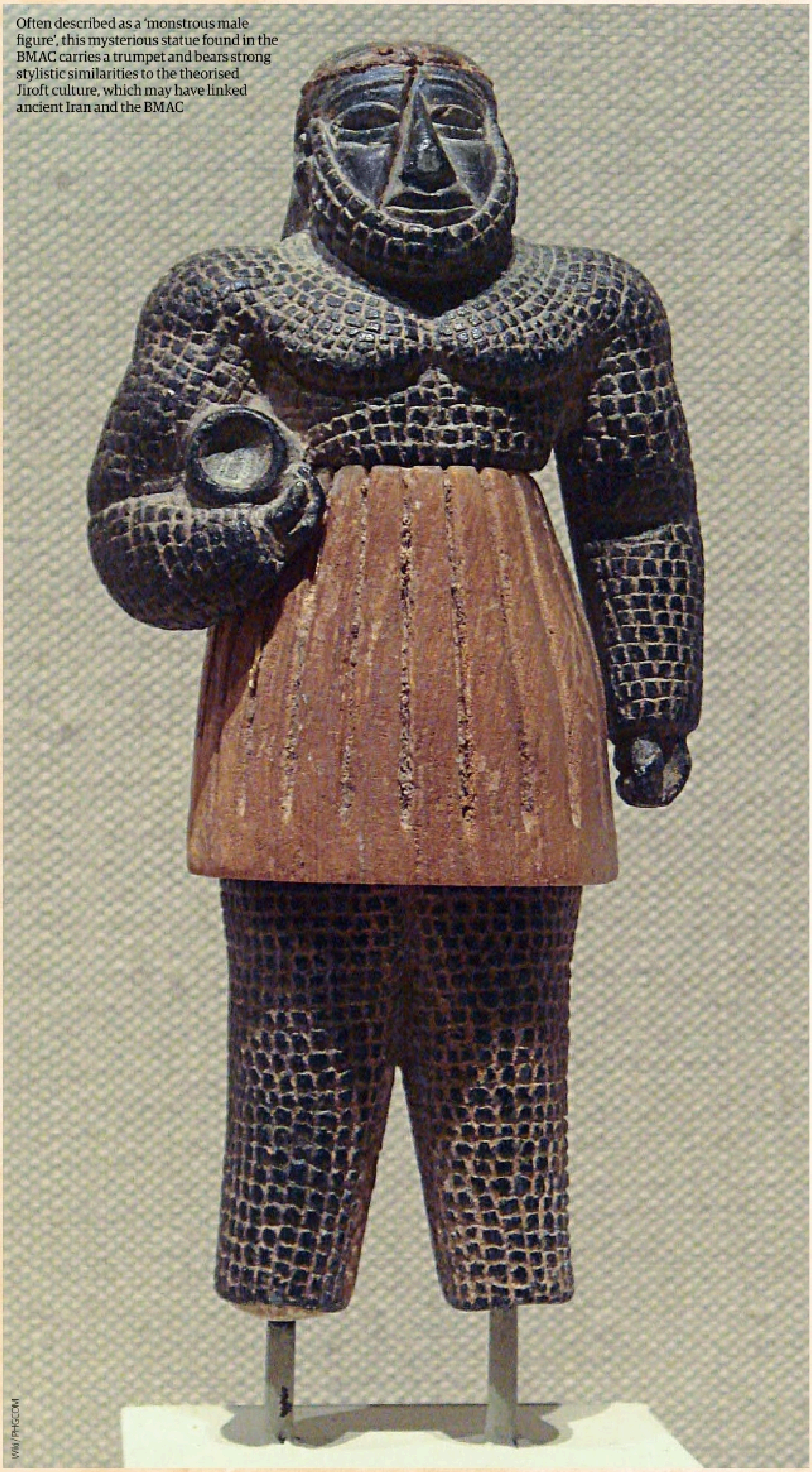
The Bronze Age ruins at Gonur Tepe, Turkmenistan. Sarianidi believed that this large, fortified site was the capital of the BMAC civilisation

Wiki/David Stanley

the legend that Zoroaster was from the lands beyond the river. Sarianidi certainly believed that his finds supported this hypothesis, asserting that the region was "the native land of the Zoroastrians and, probably, of Zoroaster himself".

Deliberate misinterpretation of Indo-Aryan texts by Arthur de Gobineau, a 19th-century French aristocrat and advocate of racism, eventually resulted in the incorrect idea of the blonde, blue-eyed Aryan 'master race' that Nazi Germany found so beguiling. The Turanian opposite of the Aryan was, therefore, in the words of one misguided mid-19th century racial anthropologist, "not inherently a savage, but he is radically a barbarian. He does not live from hand to mouth, like a beast, but neither has he in full measure the moral and intellectual endowments of the true man". It wasn't until Sarianidi's discoveries were revealed to the post-USSR West that the world realised that his research "proved that the Amu Darya (Oxus River) valley in Central Asia constitutes a fourth point of origin of urban civilisation, along with the Nile, Indus, and Tigris-Euphrates valleys". (Sarianidi later updated his statement to acknowledge that China was another cradle of civilisation, too.)

Sarianidi's research demonstrated that, far from being the mysterious, barbarous and backward nomadic society of legend, the Bronze Age people of this region were settled, urbane, technically adept, cultured and diplomatic. Artefacts found in the region and in the homelands of its trading partners point to Bronze Age commercial relationships with similar civilisations in Iran, India and the Eurasian steppes, including Elam and Harappa. Archaeological remains denote palaces or temples and other monumental architecture; material-culture finds include religious idols, jewellery, tools, fine metalwork, wheel-turned ceramics, and even a small stone seal with Chinese-style characters on it, a tantalising hint at the possibility of a written



Often described as a 'monstrous male figure', this mysterious statue found in the BMAC carries a trumpet and bears strong stylistic similarities to the theorised Jiroft culture, which may have linked ancient Iran and the BMAC

WM/PHG.COM

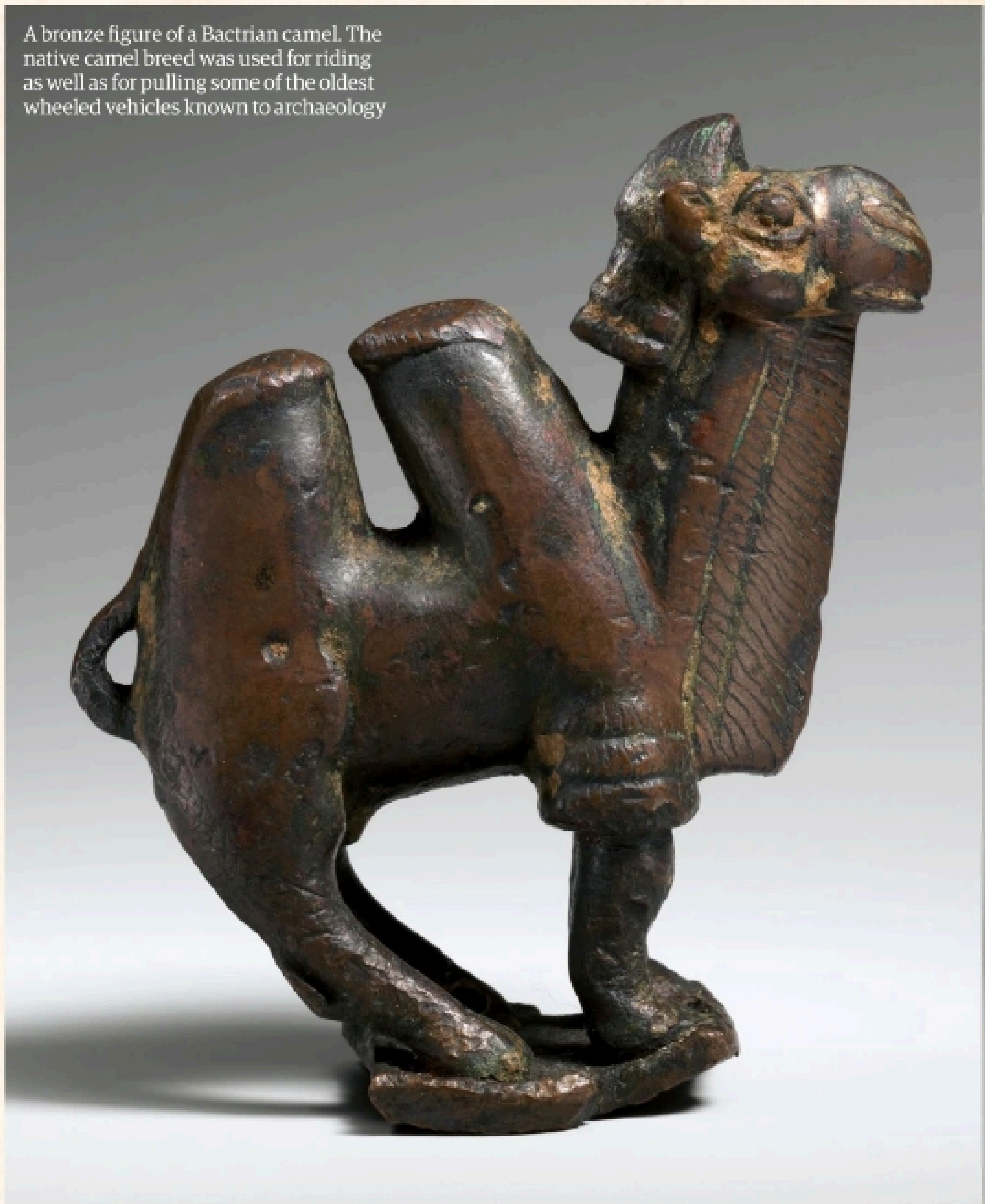
"Many classical and Medieval writers describe the area in terms of its lush greenness"

script. As archaeologists patiently persuaded the dusty Karakum to give up its secrets, Sarianidi dubbed the sites that riddle the black earth beneath the sands the Bactria-Margiana Archaeological Complex (BMAC).

The river valley and the desert's string of oases made the BMAC an ideal path along what would later become the Silk Road, the vast trading route between Asia, Africa, the Levant and Europe, and even during the late Chalcolithic and Early Bronze Age the Bactrians grew rich on passing trade. Sarianidi theorised that the route that would eventually become the Silk Road was, in the Bronze Age, the main artery of the lapis lazuli trade. The semi-precious blue stone was abundant in Central Asia – it's been mined in Afghanistan since the 7th millennium BCE – and was hugely popular with the Bronze Age Mesopotamians, ancient Egyptians, and the civilisations of the Indus Valley and the Caucasian steppes.

The Bactrians lived along and controlled a significant part of the trading route, and picked up innovations from travellers through their territory. The earliest known use of irrigation was in 6th-millennium-BCE Iran, but by the height of the BMAC the agricultural technique had travelled far enough down the lapis lazuli route to make the desert bloom; many classical and Medieval writers describe the area in terms of its lush greenness and fertile soil. Nearly three millennia later, the 10th-century Iranian author Istakhri could still write of Transoxanian Samarkand: "In it are the best trees and fruits, in every home are gardens, cisterns and flowing water."

Initially the Bronze Age people of the BMAC grew wheat, fruit trees, grapes and barley; they tamed the ox, two breeds of sheep, and a particular breed of pig first domesticated in southeast Asia, suggesting that the initial stock animals were brought there deliberately. Other domesticated animals soon followed: another breed of sheep, goats, the native Bactrian camels (who pulled carts), possibly even the odd horse or two thanks to the Bactrians' trade links with the Sintashta and Andronova cultures of the steppes (although no evidence has been found for horses being a major part of their Bronze Age culture), and dogs. Much later, a grisly assertion by the Greek philosopher Strabo, himself born in Asia Minor, claimed that the Bactrians bred a certain type of dog that they dubbed "undertakers", whose role was to hunt and consume the elderly and infirm, who were cast out of Bactrian society. In his *Geographica*, Strabo claims to have been told that the towns of the Bactrians looked neat and



A bronze figure of a Bactrian camel. The native camel breed was used for riding as well as for pulling some of the oldest wheeled vehicles known to archaeology

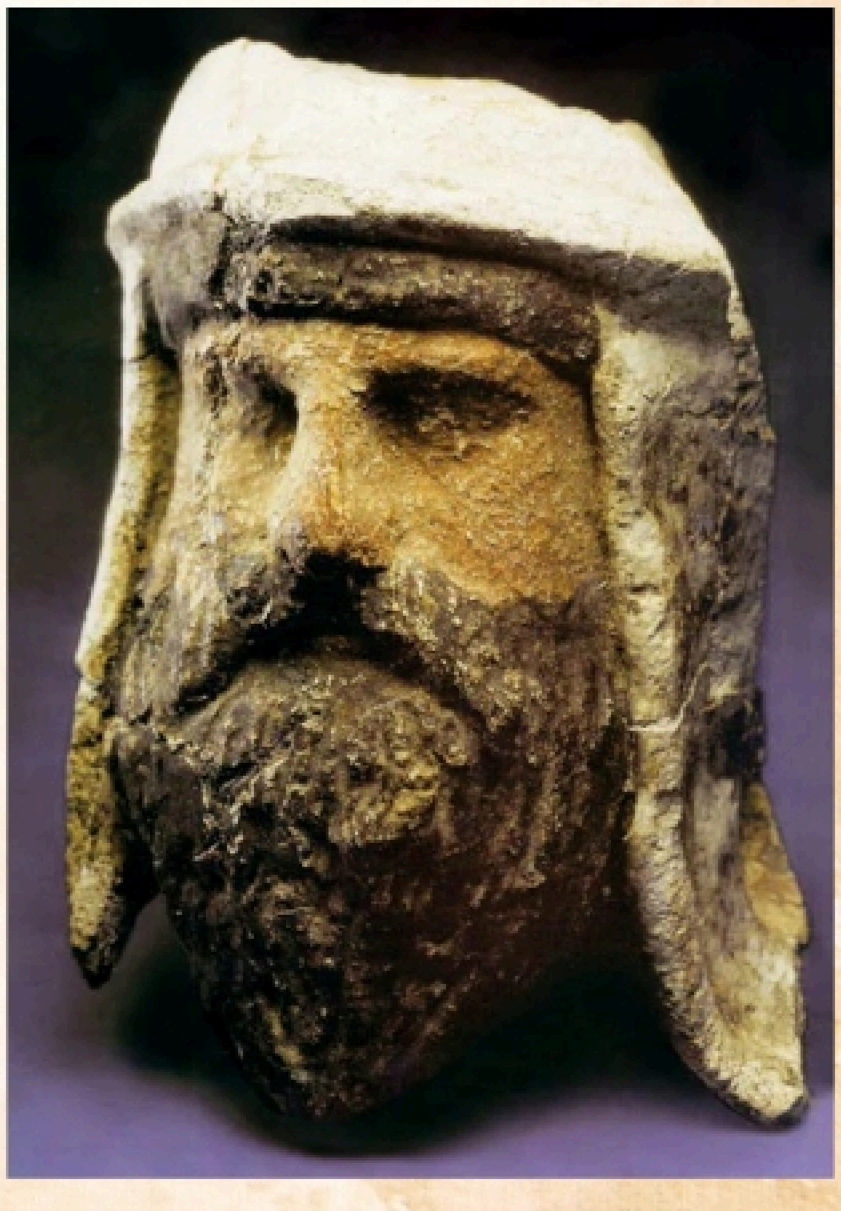
Archaeologist Viktor Sarianidi didn't think that horse domestication was a particularly big part of BMAC culture, but this bronze axe head demonstrates that the Bactrians were clearly aware of the domestic horse

clean from the outside, but within the walls the streets between the mud-brick houses rattled with the gnawed bones of the dogs' victims. He claimed that Alexander the Great put a stop to the practice, but no evidence of this bizarre ancient urban legend has ever been found.

What have been found are figures called 'Bactrian princesses'. Again, the Macedonian conqueror probably had an inadvertent role in their naming, which later historians may well have based on Alexander's wife Roxana, perhaps the world's most famous Bactrian princess. These Bronze Age female figures however, made of stone and clay and around the size of a child's doll, wearing elaborately stylised robes and headdresses that merge with their hair, are thought to represent an ancient pagan goddess. The most likely candidate is a putative ancient Proto-Indo-Iranian fire goddess, echoes of whom are thought to survive in the Hindu goddess of the southern sun Tapati, the Scythian hearthfire goddess Tabiti (whom Greek historian Herodotus equated with the Greek hearth goddess Hestia), and the Avestan word 'tapaiti' ('it burns').

It's even possible that some of the fire temple sites found in the BMAC pre-date the Zoroastrian religion that they're traditionally associated with, and were originally dedicated to this mysterious fire goddess instead. Indeed, a clash of similar beliefs and practises, embodied by different deities for different peoples, would certainly explain the traditional enmity between the Zoroastrian Iranians and the possibly pagan Bactrians. The princesses could have been folkloric in nature rather than religious – there's evidence that some Bactrians practised more well-known religions, particularly early Zoroastrianism, Hinduism and Buddhism – but the princess figurines are often found within special rooms inside dwellings, which suggest that they were venerated in household shrines.

Whoever the gods of the Bactrians were, this wealthy, well-connected, hi-tech Bronze Age culture must have thought that they had plenty to thank them for. Their proto-cities were tidy and safe, their farms plentiful, their lives enriched by labour-saving devices, their coffers rich from passing trade, their storehouses replete with grain and wine, and their mysterious religious rites fuelled by a heady brew of cannabis, opium and ephedra. Now that Viktor Sarianidi's discovery has come out from behind the Iron Curtain, we can look forward to many more discoveries about their fascinating lives and culture.

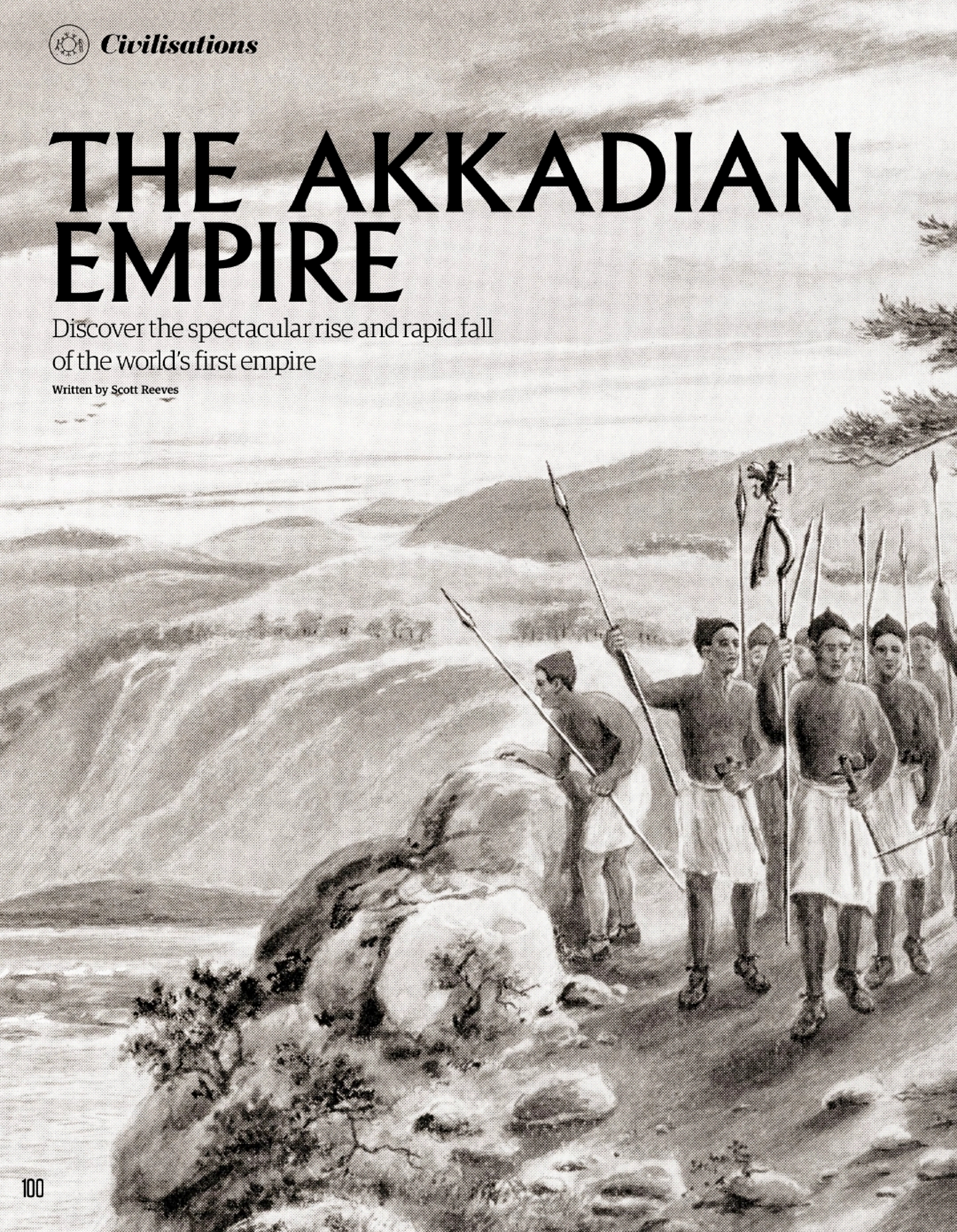


This sculpture is thought to represent a particular type of Zoroastrian cleric known as a mobad, who could officiate over religious services. His headdress is distinctively Bactrian

THE AKKADIAN EMPIRE

Discover the spectacular rise and rapid fall of the world's first empire

Written by Scott Reeves



The Akkadian Empire ruthlessly subdued all opposition in Mesopotamia, but also tried to assimilate those it conquered

The Akkadian Empire

When the 5,000-strong army of Sargon of Akkad managed to conquer the Sumerian city of Uruk – once the biggest in the world, with a population ten times larger than the army that faced it – it was a milestone moment in world history.

The balance of power between the kingdoms of Akkad and Sumer had shifted, allowing Sargon to capture 34 more Sumerian cities and his Sumerian fellow monarch, Lugal-Zage-Si. In conquering his neighbour to create a multi-ethnic territory ruled by a central government, Sargon had created the world's first empire in what is mostly modern-day Iraq.

Sargon the Great's rise to power was spectacular. Originally a cupbearer to the king of Kish, he was subsequently appointed to the position of gardener, which gave him the vital responsibility of clearing the irrigation canals that allowed enough food to be grown in the hot Mesopotamian climate. This gave Sargon access to a disciplined corps of workers who became the foundation of a personal army, eventually allowing him to seize the throne in 2334 BCE.

Sargon was ruler of one of several kingdoms throughout Mesopotamia, but he had higher ambitions. Aside from conquering his Sumerian rival to the south, he embarked on a series of invasions of nearby territory, seizing land and amalgamating it into an empire that he ruled from his capital, Akkad. His armies ventured westwards into Syria and Canaan, reaching the Mediterranean Sea and perhaps even stretching across the water to Cyprus. To the east, the Elamite cities and kingdoms of modern Iran came under Akkadian control. To the north, Sargon claimed land as far as the mountains of Anatolia (modern Turkey), while to the south his influence reached to Magan (modern Oman).

However, the outposts of the Akkadian Empire did not always accept Sargon's rule without question. Rebellions flared in Elam and Assyria, but the imperial armies ruthlessly quashed any opposition and installed loyal Akkadian governors to control those they vanquished.

That Sargon was able to build and maintain a grip on such a vast domain was undoubtedly helped by his longevity – he sat on the throne for 56 years – but the empire continued to grow under his successors. Some degree of instability was inevitable after the death of a king who had ruled so successfully for so long, but two of Sargon's sons, Rimush and Manishtushu, faced down further revolts and rebellions. Indeed, both Rimush and Manishtushu actually suffered more from internal threats than from the wider empire – both were assassinated by courtiers in various palace conspiracies.

By the time Naram-Sin, Manishtushu's son and successor, acceded the throne in 2254 BCE, the Akkadian Empire was ready to resume a policy of conquest. The Syrian kingdoms of Ebla and

© Getty: Universal History Archive

Armanum fell to the new king, while his forces ventured further into Anatolia and battled the Hittites. Naram-Sin's 36 years on the throne saw the empire reach its greatest extent and coincided with a second golden age of conquest.

Yet the Akkadian Empire was more than just a powerful military force – it had a sophisticated economy, although it was almost entirely dependent upon agriculture. Two belts of fertile land made it the breadbasket of the region; one in northern Mesopotamia that was fed by rainfall, and one in the south that relied upon irrigation canals to remain productive. Grain and oil rations were controlled by the state and distributed in standardised vessels. Where shortages occurred in one area, another would be able to make up the shortfall from its stores.

Taxes could be paid either in produce or in kind by labouring on public projects, such as building city walls and temples or carrying out the vital autumnal clearance of irrigation ditches. Nomadic farmers could graze sheep and goats near the canals but had to pay a levy in wool, meat, milk and cheese.

Although the Akkadian Empire generally benefited from a surplus of foodstuffs, it was short of other resources, particularly metal, timber and stone. A desire to secure reliable supplies of

THE BATTLEGROUND OF EMPIRES

Uncover Mesopotamia, the land that was fought over by a succession of ancient empires

Conflict in Iraq is, unfortunately, nothing new. The brief flourishing of the Akkadian Empire in Mesopotamia was followed by a Dark Age under the Gutians, with few written documents to shine a light on the era. However, the peoples of the former Akkadian Empire eventually coalesced into two long-lived nations: Assyria in the north and Babylonia in the south.

Babylon fell in 539 BCE, when it was conquered by the Achaemenid Empire – the first of the Persian incursions from the east. The next set of invaders came from the west in the form of Alexander the Great in 332 BCE, after whose death Mesopotamia became part of the Greek Seleucid Empire.

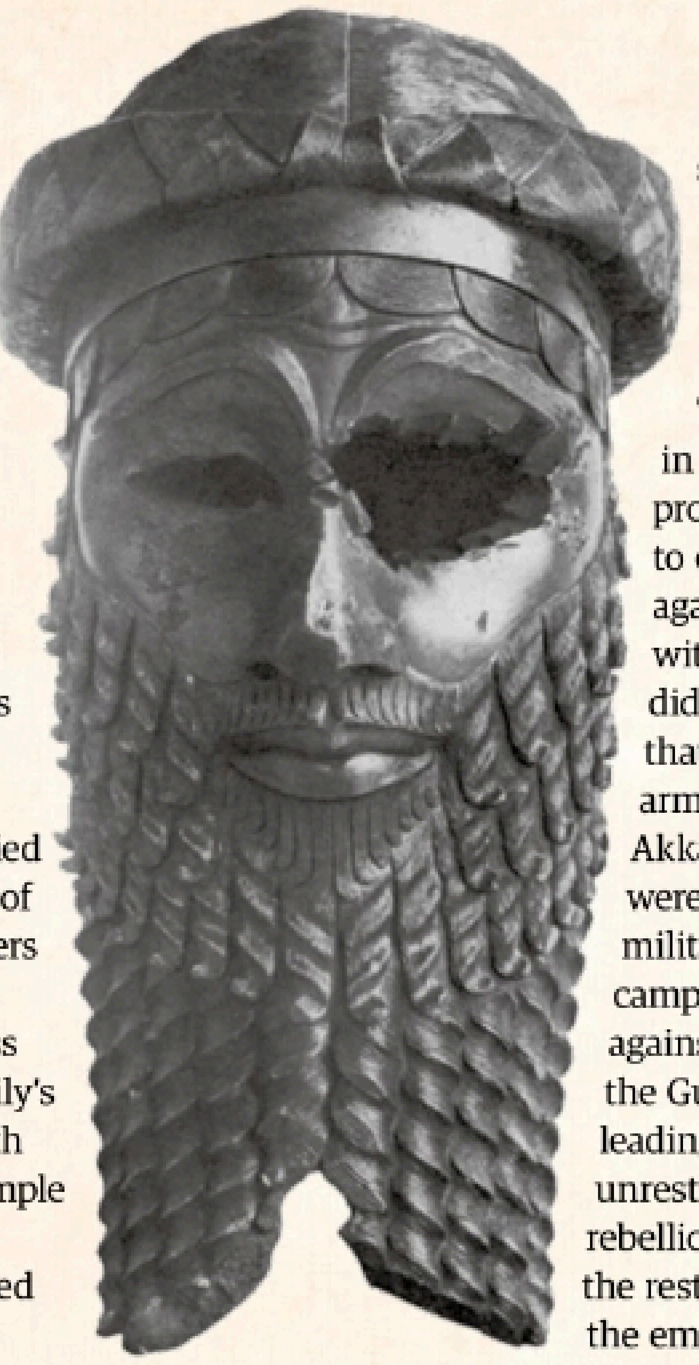
By 150 BCE, the pendulum had swung back to the east as Mesopotamia came under the control of the Parthian Empire. The fertile land between the Euphrates and Tigris Rivers was a scene of conflict between Romans and Parthians for centuries, eventually being split between Roman Byzantines in the west and Sassanid Persians in the east until the Muslim conquest of the Levant in the first half of the 7th century. Barring Mongol invasions, the battleground of empires was finally at peace until the 20th century.

Perhaps the most famous Mesopotamian ruler, Hammurabi of Babylon controlled the region 500 years after the Akkadian Empire

© Wiki, Collection Musée du Louvre

Cylinder seals, such as this one depicting a seated god of water and wisdom, were used to seal letters in the Akkadian postal system

© Granger Historical Picture Archive / Alamy



This life-size bronze head housed in the National Museum of Iraq is thought to depict either Sargon or Naram-Sin

© The Picture Art Collection / Alamy

these in part contributed to Akkadian conquests. The Taurus Mountains of Anatolia provided silver, while copper ore could be found in Magan, lapis lazuli in Afghanistan and timber in Lebanon.

In order to secure their family's place on the throne, the Akkadian monarchs made full use of their wider family as a strategic network of control. They installed their sons as provincial governors and married their daughters to other rulers of imperial territory. Two daughters of Sargon and Naram-Sin were also appointed as high priestess to Sin, meaning that their family's power would be felt as far south as the influential Sumerian temple complex of Ur.

The Akkadians also attempted to assimilate their conquests to create a single, consolidated nation. Akkadian became the primary language of Mesopotamia, although many of its people were bilingual and continued to speak Sumerian. Communication across the empire was possible through a road network that also supported a postal service. Clay tablets inscribed with Akkadian script were wrapped in outer clay envelopes marked with the name and address of the recipient and the seal of the sender; only the intended recipient was supposed to break the envelope to reveal the contents. A new calendar based on year names, where each year of a king's reign was named after an event performed by the king, was adopted across Mesopotamia.

What we don't know a great deal about, however, is the capital itself. The location of Akkad is still shrouded in mystery. The name 'Akkad' does not derive from the Akkadian language, suggesting that the city existed prior to Sargon and the rise of his empire. The most likely site is on the Tigris River, somewhere between the modern cities of Samarra and Baghdad – however, that still leaves more than 80 miles to explore.

Wherever his palace was located, such was Naram-Sin's power as the self-titled king of the Four Quarters that he was elevated to the status of a god and granted his own temple establishment. The deification of a ruler was not new – it had happened to Gilgamesh, who had ruled as king of Uruk a few centuries previously – but it was the first time a king was considered a god during his lifetime. However, an ancient text called the *Curse of Agade* tells of a king, thought to be Naram-Sin, who angered the gods through his deification and by tearing down the Temple of Enlil in Nippur.

Whether or not there was any divine retribution involved, the Akkadian Empire collapsed spectacularly just 64 years after Naram-Sin's death. Naram-Sin's son, Shar-Kali-Sharri, faced increasing raids from the Guti in Sumeria. This nomadic people lived in the Zagros Mountains and proved stubbornly determined to carry out hit-and-run raids against Akkadian targets. Faced with a new type of enemy who did not have a city-state base that could fall to the Akkadian army, the Guti slowly crippled the Akkadian economy. High taxes were imposed to pay for ongoing military campaigns against the Guti, leading to unrest and rebellion in the rest of the empire. By the time Shar-Kali-Sharri died without an heir, the Akkadian Empire had fallen back to a rump around the capital and three years of anarchy left the throne unclaimed. The civil war was won by Dudu, who was succeeded by his son, Shu-Turul. However, neither king was able to prevent the eventual loss of Akkad to the Guti.

> "Such was Naram-Sin's power as the self-titled king of the Four Quarters that he was elevated to the status of a god"

One explanation for the sudden collapse of the once-great empire was that it relied on personal leadership. Sargon and Naram-Sin may have had the capability of building and holding onto vast territories, but the other kings who sat on the throne did not have the same aptitude. However, some scientists have suggested an alternative explanation – that the final years of the Akkadian period coincided with a long drought caused by declining rainfall.

Archaeological evidence indicates that several cities in Sumer were abandoned in the late Akkadian period. Excavations at Tell Leilan in Syria show that massive city walls and a temple were built when times were good, but that soon after all trace of human activity in the city of 28,000 people disappeared. Soil samples indicate that the fine sand covered the ground with no trace of the earthworm activity usually found in fertile soil. At a similar time, the nearby city of Tell Brak shrank in size by 75 per cent.

If a similar story played out across Mesopotamia, the economy of the Akkadian Empire would have gone into freefall. Agrarian output would have plummeted and trade would have collapsed as people moved away from urban areas in a desperate search for reliable water. Centralised control of a vast empire became impossible and loyalty to Akkad would have evaporated as quickly as the water.

Whatever the cause of its spectacular collapse, the Akkadian Empire remains the world's first; a brief but historic milestone. It makes Sargon the forebear of later illustrious emperors including Augustus and Genghis Khan – not a bad achievement for a former royal cupbearer.

An inscription at the base of the Bassetki Statue, unearthed in the 1960s, indicates that it once stood in a doorway of Naram-Sin's palace

© Getty; Paula Bronstein

BRITAIN AND THE ATLANTIC BRONZE AGE

As Britain and other Atlantic countries headed into the Bronze Age, new burial rituals, new artefacts and new migration trends changed the region forever

Written by Poppy-Jay Palmer

Getty / Geography Photos

Thousands of artefacts from the Bronze Age have been unearthed by archaeologists in Britain and Europe, with each one shedding new light on the era

As the Bronze Age swept across the globe like a picnic blanket in a hurricane, the way in which each civilisation reacted to the era varied. The events of the Bronze Age period around Britain, Ireland, France, Spain and Portugal – also known as the Atlantic Bronze Age – were certainly no different. Though the cultures were strewn across thousands of miles of land (and sea), trends within the walls of this cultural complex were often very similar.

A practice that became popular during the Atlantic Bronze Age was ritual hoard burials, which were exactly as they sound. Through digging up old Bronze Age sites, modern historians have discovered ancient people liked to bury large hoards of metal, including weapons, coins, jewellery and more, under the ground. The hoards were deposited in ritual areas, usually in waterlogged landscapes that are easy to dig up like rivers, lakes and bogs. Though the practice may sound somewhat nonsensical, historians have offered a number of explanations for it over the years. The most common is the most obvious: burying things is a good way of keeping them safe for an indeterminate amount of time before digging them back up again. However, hidden hoards are not always retrieved, which goes against the previously suggested theory. It is even believed that many ritual hoarders actually buried their goods with absolutely no intention of ever going back for them.

Burying hoards was common practice within the British Isles during the Bronze Age, but it also slowly spread to other parts of the Atlantic cultural complex. It peaked between 1000 and 800 BCE, but after waning slightly it didn't go out of fashion completely. Ritual hoard burying continued into the Iron Age and even the Roman period, and people still dig up the results today. One example is the famous Frome Hoard, which was unearthed in Frome, Somerset, in 2010 by then-amateur metal detectorist Dave Crisp. The discovery turned out to be the world's largest collection of Roman coins to be found in a single container (52,503, if you're interested). Following the discovery, Crisp, no longer amateurish, wrote and published his first book, *Metal Detecting: All You Need to Know to Get Started*.

Archaeologists and metal detectorists have been working together for years, and they have successfully excavated a number of the Bronze Age's buried hoards. Though many of them consist of large quantities of coins, much like the Frome Hoard, currency wasn't the only thing the ancient

Scientists used the tooth enamel from the bodies found in the burial sites around Stonehenge to learn more about the migrations of the Beaker people

Wild / Frédéric Vincent

people buried. Some were known to conceal a number of different bronze artefacts, including axes, weapons of war like lunate spearheads, V-notched shields and swords, and elite feasting equipment like articulated roasting spits, flesh hooks and cauldrons.

Bronze Age hoards have been found all over Britain, from Cornwall and Somerset to Dingwall and Angus, since the 18th century, and over 350 have been found in England alone. The earliest find was the Arreton Down Hoard, which was discovered on the Isle of Wight in 1735, and is currently on display at the British Museum in London. Dating back to somewhere between 1700 to 1500 BCE, the hoard was relatively small, consisting of seven bronze spear-heads, four axes, a dagger and a halberd.

Hoards vary in size, with some containing only a small selection of scraps of metal and others hiding the bronze goods of what could well have been whole villages. Britain's largest unearthed Bronze Age hoard to date is the Isleham Hoard, which has been dated back to 1000 BCE and was dug up in the English county of Cambridgeshire. It was discovered by brothers William and Arthur Houghton in 1959, and contained more than a whopping 6,500 pieces of worked and unworked bronze. The pieces included bronze swords, spear-heads, arrows, axes, including Bronze-Age-era

Bronze Age hoards were usually buried in watery areas like bogs and rivers. Here, a diver collects a sword from a hoard in a river in Slovenia

Getty / Arne Hodalic

wiki / Miguel Hermoso Cuesta

The Beaker people were often buried with pottery and metal goods, as demonstrated by this reconstruction of a Beaker burial

> "Though no specific linguistic group has ever been proven to connect to the vessels, a link to the Celts has been hypothesised"

axes known as palstaves, knives, daggers, armour, decorative equipment made for horses, and even fragments of sheet bronze.

Each hoard is different, and each one gives new insight into what life was like for the people of the Bronze Age. But while some stand out more than others, others are downright strange. The Rossett Hoard, which was found in Wrexham, Wales, and dates back to 1000 to 800 BCE, contained bronze axes with gold bracelet pieces stuffed inside, which weren't discovered until historians began to examine the inside of the tools. The Lancaster Hoard, buried in Lancashire between 1150 and 800 BCE, was one of the first hoards discovered in northwest England and featured many of the usual suspects: axes, jewellery and decorative pieces… But it also contained a perfectly preserved Bronze Age flower, which analysts have since decided was a meadowsweet, a type of flower that is often used in medicines, to spice fermented drinks and to make rooms smell nice.

Stranger still is Flag Fen, a hoard site that spans across almost a kilometre of land. Flag Fen, which is what archeologists call a 'depositional site', can be found in East Anglia and has been dated back to the Middle Bronze Age to the Early Iron Age periods, and accumulated from 1350 to 150 BCE. Spread out over several centuries, Flag Fen is made up of multiple hoards that were all buried under a kilometre-long causeway that was constructed from around 60,000 upright timbers and stretches over the wetland between Fengate and Northey Island. Upon their modern discoveries, the hoards contained everything from swords, daggers and spearheads to rings, earrings and brooches, and even chisels, awls and punches that may well have made up a craftsperson's entire toolkit. The sheer variety of the hoard came from local people regularly depositing artefacts over 1,200 years.

One of the hoarding sites that told the most about prehistoric people, though, was the famous Near Lewes Hoard found in the English county of East Sussex. The hoard itself was buried during the Middle Bronze Age (around 1400 to 1250 BCE) in a earthenware vessel and upon its excavation was found to contain more than 50 different objects with varying origins. Some were fashionable pieces crafted to adorn garments and the like, some were jewellery, and some were clearly weapons.

The strangest thing about the collection, however, was the fact that different pieces were local to different places. The hoard contained items with connections to East Sussex, like the famous 'Sussex Loop' bracelets that were usually only found within the vicinity of Brighton and the palstave axes that were common across Southern England. But it also featured more rare and exotic pieces from foreign lands, like necklaces made of ceramic and amber beads from the Baltic, decorative gold discs that were associated with France, and 'tutuli' mounts that were made in Germany. As well as holding special importance to the people who buried it, the variety within the Near Lewes Hoard also gave a better look at trade relationships of the era between Sussex locals and manufacturers from the Continent. In a PAS Specialist Report, Bronze Age expert Ben Roberts called it "the most spectacular and overtly continental manifestation of a distinct region of the Middle Bronze Age 'ornament horizon' hoards".

Despite its name, bronze wasn't the only material that defined the Atlantic Bronze Age. In around 2000 BCE, Britain was gifted with a new style of pottery, and Beaker culture was born as a result. The now-famous archaeological culture was given its name in 1904 by Scottish soldier and archaeologist John Abercromby, who was inspired by the culture's distinctive inverted-bell beaker pottery that was used at the very start of the European Bronze Age. Upon discovering the pottery artefacts, Abercromby interpreted them to be drinking vessels, but they could well have been used for another purpose.

Though no specific linguistic group has ever been proven to connect to the vessels, a link to the Celts has been hypothesised by many, although the Celtic migrations are thought to have occurred long after Beaker culture is supposed to have spread through Europe. As a result, there are still contrasting opinions within archaeological circles when it comes to tracing the origins of the culture, and some have even suggested that the Beaker people may have been an older Indo-European group that the Celts might have been part of at some point. Another theory is that Beaker culture had no clear starting point, and was instead shared among many different ethnolinguistic groups that were later unified by the Celtic migrations.

Following its somewhat hazy beginnings, Beaker culture – also known as Bell Beaker

Bronze Age era weapons like axes, spearheads and swords are regularly found among the goods in unearthed ritual burial hoards

Wiki / The Portable Antiquities Scheme

REDUCE, REUSE, RECYCLE BRONZE

The contents of Bronze-Age-era ritual burial hoards didn't always have significant personal meaning; some were simply business, as evidenced by the Boughton Malherbe Hoard from the Late Bronze Age, discovered in Kent from 850 BCE. In all, the hoard contained 352 pieces and is the third largest of the Bronze Age ever found in Britain. It's normal for hoards to contain broken pieces (the pieces have been buried for millennia after all), and some pieces are even bent or broken intentionally as part of their burial. But there was something different about the broken pieces found in the Boughton Malherbe Hoard.

After much analysis and speculation, archaeologists believed the hoard to be part of a sophisticated recycling industry that dealt in international prehistoric scraps. Many of the artefacts found within it seemed to have originated in northern France and the Atlantic coast of mainland Europe, while others were believed to have been made in Wales about a century beforehand and transported to France before making a return trip back to Britain 100 years later. From their findings, archaeologists deduced that people have been shipping their scrap metals across the Channel to be reworked and reused since the Bronze Age.

The Boughton Malherbe hoard was the third largest Bronze Age hoard ever found in Britain, and suggested that some prehistoric people were enthusiastic about recycling

Wiki / The Portable Antiquities Scheme

HISTORY MEETS SCIENCE

Advancements in technology have meant that scientists have been able to gather more evidence about life during the Bronze Age over the last decade than ever before. In the past, common pitfalls in ancient DNA analysis included huge costs, the high risk of contaminating the historical samples with the modern DNA of those handling them, and the inconsistent preservation of ancient DNA in burial sites.

As well as examining enamel from the teeth of skeletal remains found in Beaker burial sites, Professor Ron Pinhasi and his colleagues have since discovered that the petrous bone, which contains the inner ear, naturally preserves DNA astonishingly well. Due to its location within the cranium, the bone is often completely protected from contamination that would usually be picked up from burial conditions. After using it for data analysis, the scientists released that it can contain up to 100 times more DNA than any other bone sample.

Another helpful advancement was the technology that made it possible to enrich ancient DNA samples of around one million information-abundant single necleotide polymorphisms (or SNPs) and sequence them for analysis instead of the entire genome. This method, paired with more efficient machinery, has made analysis processes much quicker and more cost effective.

Getty / DEA / AFP / Stringer

As scientific technology has developed, scientists have been able to find new and better ways of collecting data from ancient Beaker DNA

culture – had a far greater impact on the people of the Bronze Age era that one might expect. As the years passed it became more than just a form of pottery and spun into a complex cultural phenomenon involving many types of metalwork in copper and gold, archery and types of ornamentation, as well as ideological, cultural and religious ideas. It may seem unbelievable that what was essentially just a collection of drinking vessels could have had such a huge impact on ancient Europe and beyond, but Beaker culture is thought to have practically ushered in the start of the Bronze Age.

The burial mound of the Beaker people, found in the ditches around Stonehenge, Wiltshire. Several other Beaker burial sites have been found around the county

Getty / DEA / S. Vannini

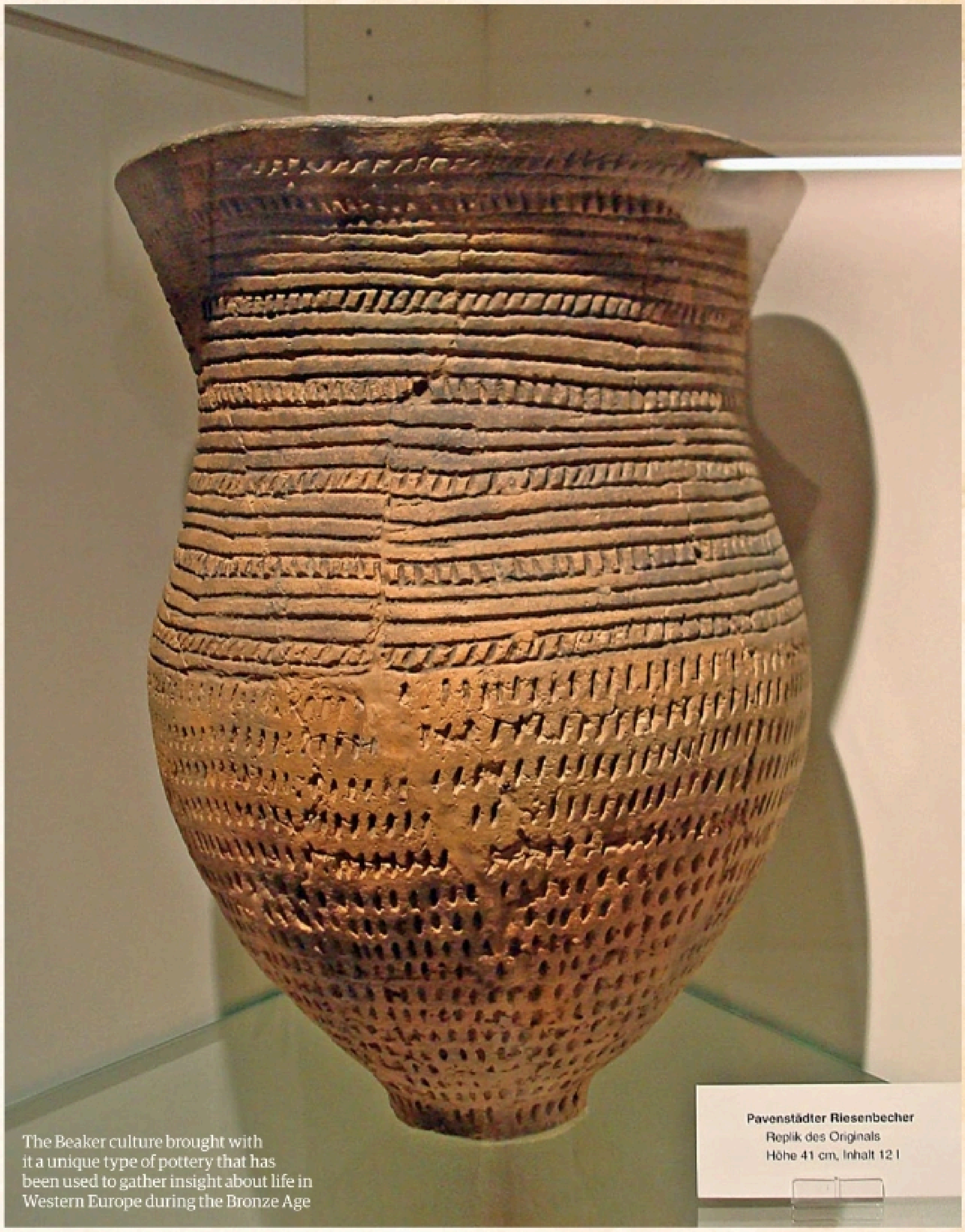
The bell-shaped style of pottery that came out of the Beaker culture is believed to have originated in Iberia, now present-day Spain and Portugal. Following the migration of people and the fact that migrating people tend to take their things with them, the pottery finally reached Britain less than 100 years later. One of the most commonly found types of beaker is the 'Maritime' beaker, which could be found along the Atlantic and Mediterranean shores as well as in Iberia during the earlier chunk of its life. Repeatedly patterned with a series of horizontal bands over its surface, it is thought to have originated very early on in the Beaker period. Despite its name, the Beaker period brought with it a range of artefacts and paraphernalia, like stone wrist guards and flint arrowheads used for archery, copper daggers and buttons sporting V-shaped holes. The time presumably also ushered in a new set of beliefs and practices but, compared to artefacts, ancient ideas are much harder to examine.

Geography is a key theme to consider in the context of the Beaker culture and its impact on the era. It marked a period of cultural contact through Atlantic and Western Europe on a scale that the continent had never seen either before or since. It is widely considered to be the western equivalent of the Corded Ware culture (3000-2500 BCE), which saw a shift in migration through the exchange of cord-decorated ceramics and encompassed most of continental northern Europe from the Rhine in the west to the Volga in the east. However, Corded Ware never made it to Iberia, France or the British Isles.

Beaker culture and its spread has long been one of the key questions of the migrationism versus diffusionism debate in archaeology of the 20th century. In relation to the debate, migrationism explains cultural change in terms of human migration, with people moving from place to place and sharing experiences, while diffusionism explains the change based on trans-cultural diffusion of ideas rather than of populations. The phrase 'pots, not people' is regularly used when discussing the latter. Did the culture spread due to an influx of people following the migration of warriors, craftsmen and traders, or did it spread following the sharing of ideas and objects, and wide exposure to other cultures? With both people and artefacts of the Beaker culture constantly moving around, it's hard to tell the true cause of the trend, and historians still debate the cause and effect to this day. One thing is certain, however: the movement of people throughout Europe during the early Bronze Age and the Beaker culture period brought about a change like no other.

Before the Neolithic era, the burial of the dead had been somewhat communal, with bodies being secreted into mass graves, including chartered cairns and long barrows. Following the arrival of the Beaker people, however, the burial process became much more individual, and folk began to deposit dead bodies in their own barrows or in small, stone-built, coffin-like boxes known as cists. Interestingly, bodies were often buried with both beakers and bronze, copper and gold artefacts placed alongside them.

Upon being discovered and exhumed in modern times, the bodies themselves also gave insight into life during the Bronze Age era, including migration patterns, with isotope studies beginning to shed new light. For example, research into the tooth enamel on the bodies found within the Bronze Age graves situated in Wiltshire, England – including ditches around famous prehistoric monument Stonehenge – indicated that some of the people buried there were originally from the area that became modern Switzerland. Each new body discovered offers new evidence that during the Beaker culture the Beaker people migrated from all over Europe to the British Isles and brought part of their previous culture with them. More often than not, historians and scientists find that the skeletal remains of individuals from Britain that lived shortly after the Beaker period had very different DNA profiles to those that came before them, indicating that the period inspired a very large population turnover.



The Beaker culture brought with it a unique type of pottery that has been used to gather insight about life in Western Europe during the Bronze Age

Wild / Hewa/Gütersloh Town Museum

Though much information can be taken from the bodies and artefacts the Beaker period left behind, there are still many unanswered questions concerning the path the culture took to get from Iberia, where the pottery originated, to the British Isles. A popular theory is that migrators headed to western and central Europe from the starting point, reaching areas like modern-day Switzerland and Holland before finally crossing the Channel to reach Britain. During the period, it is believed that up to 90 per cent of the original inhabitants of the British Isles were replaced by Beaker folk.

In the process of bringing their own brand of pottery to Britain, the Beaker people also brought a new type of bronze metallurgy to Western Europe. Before the Beaker folk made it to Britain, metallurgy – particularly that which involved combining copper and tin to make an alloy known as bronze – was up and running, and it was a very popular practice in the southern reaches of Europe. At the same time, Britain and other areas of northern Europe were still using flint. One thing Britain did have, however, was huge reserves of tin. Europe as a whole had very few sources of the stuff, but Britain was an anomaly, and became one of the richest sources of tin in the world. Although tin is far from a precious metal nowadays, it turned into a hot commodity for the British Isles, particularly in southwestern counties like Devon and Cornwall, which quickly became home to many tin mines.

Once the Beaker people made it across the Atlantic, bringing with them their knowledge about forging bronze, Britain's relationship with other Bronze Age civilisations changed for the better. The country suddenly possessed a lot of one of the most in-demand substances of the time, and many people used the newfound knowledge to forge their own bronze. By the time 1600 BCE came around, the southwest of England was experiencing an unprecedented trade boom. Before the migrants arrived, British metalsmiths mostly made their wares from copper. But after learning the metal refining methods brought over from Continental Europe, involving mixing a small amount of tin to copper to make a much harder metal alloy, bronze gradually began to replace not only regular copper, but also stone as the primary material used for tool and weapon making. Finally Britain, once behind the rest of Europe, was pulled out of the Stone Age and launched headfirst into the Bronze Age.

> "Europe as a whole had very few sources of the stuff, but Britain was an anomaly, and became one of the richest sources of tin"

With a newfound skill in tow, English smiths began to make more than just bronze tools and weapons. Out to profit from the Bronze Age in any way they could, Britons of the period also became very skilled at making jewellery out of gold. Developments in textile production were also well underway by that point: women typically began to wear long woollen skirts with tunics, while men wore knee-length wrap-around skirts as well as cloaks, tunics and one-piece garments.

In short, the start of the Bronze Age also ushered in a new way of living for the people of Britain, and indeed the people of the rest of Western Europe, that hadn't been experienced before. Gone were the rudimental days of the Stone Age: the Bronze Age and the cultural and societal advances that came with it marked a huge leap for Europe on the path to the Iron Age and beyond.

THE BRONZE AGE AND THE FAR EAST

Everywhere reacted differently to the Bronze Age, with countries as close as China, Korea and Japan perfecting vastly different bronze casting methods

Written by **Poppy-Jay Palmer**

The Far East followed the rest of the world into the great Bronze Age with the start of the Shang dynasty, which saw a growth and maturity of a civilisation like no other. The phrase 'Early Bronze Age' is not often used in the context of China, with the time being almost synonymous with the Shang dynasty period of Chinese prehistory, dating from around 1600 to 1000 BCE. Likewise, the 'Later Bronze Age' is believed to be the equivalent of the country's Zhou dynasty period, which last from 1000 to 300 BCE and ate into what was dubbed the 'Iron Age' from the 5th century BCE.

Though the period encouraged a shift in organised labour force and skilful handiwork all over the world, the relics that have since been discovered in the Far East are at the global forefront when it comes to quality and degree of craftsmanship. Bronze was used for practical purposes in other places around the world, but the Chinese saw it as a fine material, especially when put next to the likes of stone and wood. Instead, bronze was used as a material for ritual art.

By 1600 BCE, the Chinese Bronze Age was in full swing. China during the Shang dynasty was quite unlike most would perhaps expect. For example, foods many associate with the country, including staples like rice and tea, were popular in China's southern regions, but in the north they were uncommon. With the Bronze Age came a surge in farming, with a whole new group of people learning how to farm and devising methods of producing extra food for other types of workers. As a result, northern locals often consumed cereals, bread and cakes, and drank beer, and members of the royal court could afford to add meats and wine to their diets too.

Erlitou culture played a big part in the way in which China reacted to the Bronze Age. Existing in the valley of the Yellow River – China's second longest river, which flows through nine provinces from the Bayan Har Mountains in Qinghai to the Bohai Sea in Shandong – Erlitou culture was an early Bronze Age urban society named after the archaeological site discovered in 1959 at Erlitou in Yanshi, Henan, by archaeologist and historian Xu Xusheng. Erlitou is where China's bronze metallurgy is often believed to have originated, and the site is famous for being the largest area associated with Bronze Age culture, with dedicated digs unearthing palace buildings

> "Some of the earliest Bronze Age artefacts found in China have been dated all the way back to 3100 and 2700 BCE"

Relics from China's Bronze Age have ranged in date, and led archaeologists to dispute the exact timeline of the period

Getty / Sovfoto

and bronze smelting workshops that gave insight into the way in which China responded to the historical period.

Historians still can't agree on whether or not the Erlitou period took place during the Shang dynasty or in the preceding Xia dynasty, but some of the earliest Bronze Age artefacts found in China have been dated all the way back to 3100 and 2700 BCE. As a result, the Chinese Bronze Age is often thought of as being out of sync with the rest of the world, and defined as the period between around 2000 and 771 BCE, beginning with the

Bronze Age artefacts found in China are some of the leading pieces in the world when it comes to levels of skill and craftsmanship

Getty / National Museum of Korea

The site at Erlitou still has more to be discovered, and has revealed the history behind China's Bronze Age through palaces and bronze smelting workshops

Erlitou culture and ending abruptly with the disintegration of Western Zhou rule.

Many believe that Chinese bronze metallurgy originated in Erlitou and arose independently. However, others maintain contrasting opinions on the matter, insisting that it made its way to China along the Silk Road, the network of trade routes that connected the East to the West. The latter theory is just as probable as the former, considering many economic and cultural practices were shared that way.

However the metal eventually arrived in China aside, the country had as much use for it as the rest of the world. Bronze, an alloy of copper and tin, was regularly used to fashion weapons, chariots, ritual vessels and many other items that played an important role in the material culture of the time, which has led to the Shang and the Zhou dynasties being widely known as the Bronze Age of China.

The earliest Chinese bronzes were made through using a method known as piece-mould casting, which was completely different to the lost-wax method that was optimised in most other Bronze Age societies. Piece-mould casting involves making a model of the object to be cast and then making a clay mould of that model. The mould is then cut into different sections to release it before being reassembled after firing the form the mould. Cores are then placed inside the mould if the object being cast is to be a vessel, which were increasingly common Chinese bronze items.

The piece-mould method was likely the only method of bronze casting used in China until the end of the Shang dynasty at least. Although it is a lot more complex and inefficient than the lost-wax method, it did have one major advantage in the eyes of Chinese bronze workers: decorative patterns could be either carved or stamped directly onto the inner surface of the mould before it was fired, meaning the workers were able to achieve much more definition when it came to creating intricate designs. As the Chinese mostly used bronze for finer items rather than practical tools, it made the whole process a lot easier overall.

A motif that regularly crops up among Shang dynastic-era bronze pieces is the taotie, a frontal, bilaterally symmetrical animal-like mask, usually with a pair of raised eyes and no lower jaw area. According to ancient Chinese mythology, the taotie is one of the four evil creatures of the world, along with Hundun, Qiongqi and Taowu. There is a lot of mystery surrounding the taotie and its origins, and its exact significance to the time's culture is still unknown. The design is regularly found on pieces from the Bronze Age, but some historians argue that it can be traced back to the jade pieces discovered in Neolithic sites, such as the Liangzhu culture in the Yangtze

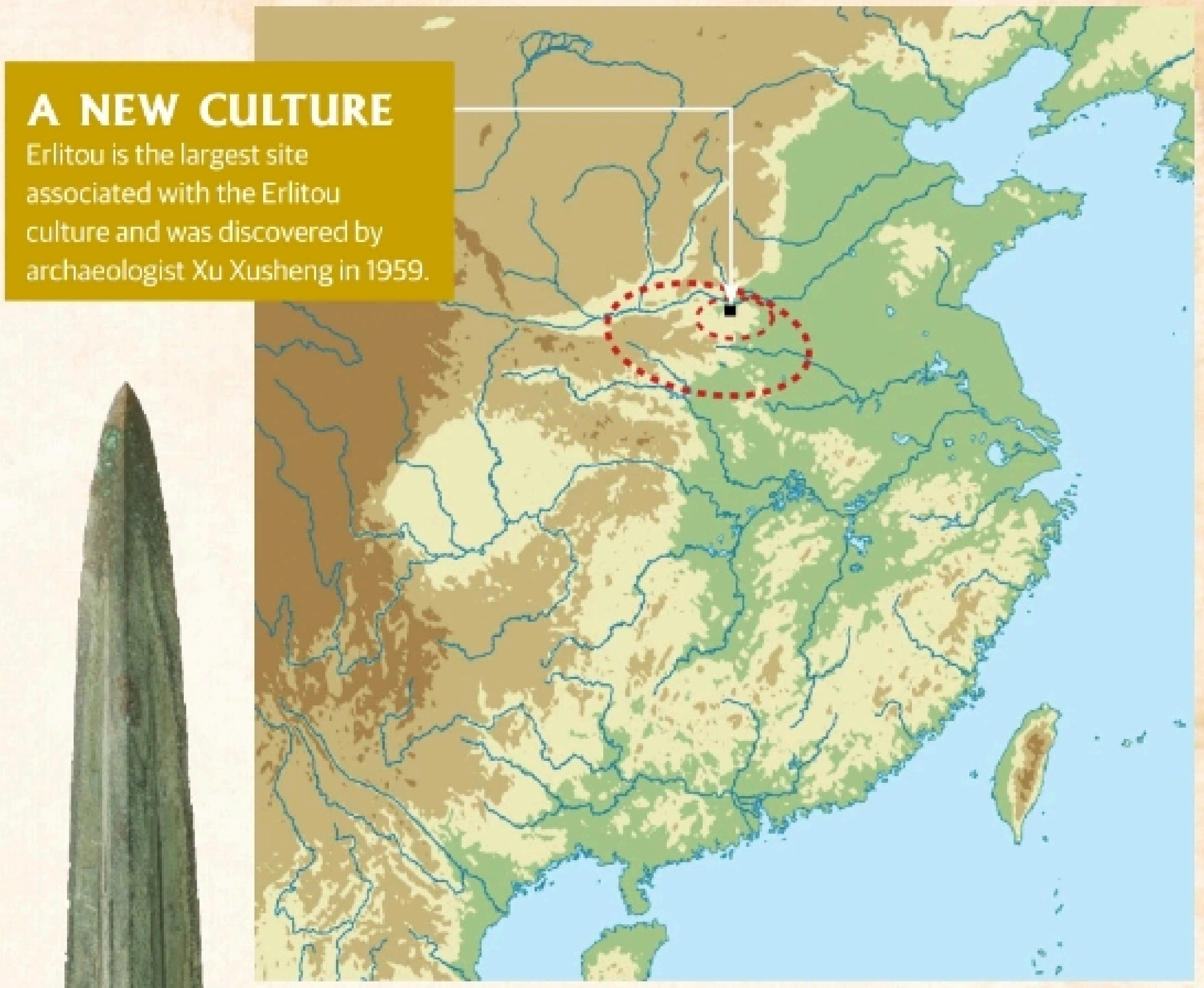
BRONZE IN JAPAN

Japan may be ahead of the rest of the world when it comes to modern-day manufacturing, but bronze didn't arrive in the country until the start of the Early Yayoi period, in around 300 BCE. Although the Iron Age came much later for most civilisations, ancient Japan's Iron Age actually began before its Bronze Age due to the country's isolation.

In the early days, Japan still had use of iron and bronze tools and weapons, but sellers had to either rely on the goods being imported from the Korean Peninsula in finished form or cast them from crude imported pig iron, with both options being brought over in ships to the Japanese archipelago.

Japan finally started producing its own bronze in 300 CE, with some of the oldest Japanese bronze artefacts being discovered at Imakura, Fukushima. Iron could be made in backyard furnaces by virtually anyone, but bronze casting required a lot more training. Production centres were limited by strict procedures to control the quality and distribution of bronze goods. As a result, the country produced a lot of iron and not much bronze, and the latter became a material associated with upper-class wealth and status until the Yayoi people learned own to produce their own products locally.

A 2nd-century-BCE Yayoi period bronze bell. As it was difficult to make, bronze became a symbol of upper-class wealth in Japan



A NEW CULTURE
Erlitou is the largest site associated with the Erlitou culture and was discovered by archaeologist Xu Xusheng in 1959.

Bronze artefacts found in Hwasun, Korea. Korean bronze typically contained a higher zinc percentage than bronze made in China

> "According to ancient Chinese mythology, the taotie is one of the four evil creatures of the world"

River Delta, dating from 3400 to 2250 BCE. Other motifs regularly found on Bronze Age pieces in China were dragons, birds, bovine creatures and geometric patterns.

While some insight into Shang dynasty culture can be determined by Shang-era inscriptions on bronze artefacts found in China, archaeologists have unearthed more than just vessels and crafts. Most information came from the oracle bones - turtle plastron, cattle scapulae and similar forms of bones and shells - that were unearthed with the bronze works, and featured etchings that formed the first significant collection of Chinese characters. In ancient China, the bones were used for pyromancy, a form of divination that involved carving questions to the deities regarding weather, crop planting, the fortunes of royal family members, military endeavours and more into the bones' surfaces. The answers were then received through applying intense heat to the bones via metal rods and interpreting the patterns of the cracks left behind.

Information about what life was like in the Far East during the Bronze Age has also been gathered in sites outside of China, like Gojoseon, an ancient kingdom that lay at the top of the Korean Peninsula. Some historians insist that Korea had no Bronze Age at all, but others debunk those theories using the three-age system, which consists of the Bissalmuneui or Jeulmun pottery period (8000-1500 BCE), the Mumun pottery period, also known as the Bronze Age (1500-300 BCE) and the Samhan or Proto-Three Kingdoms Period, also known as the Iron Age (100 BCE to 300 CE).

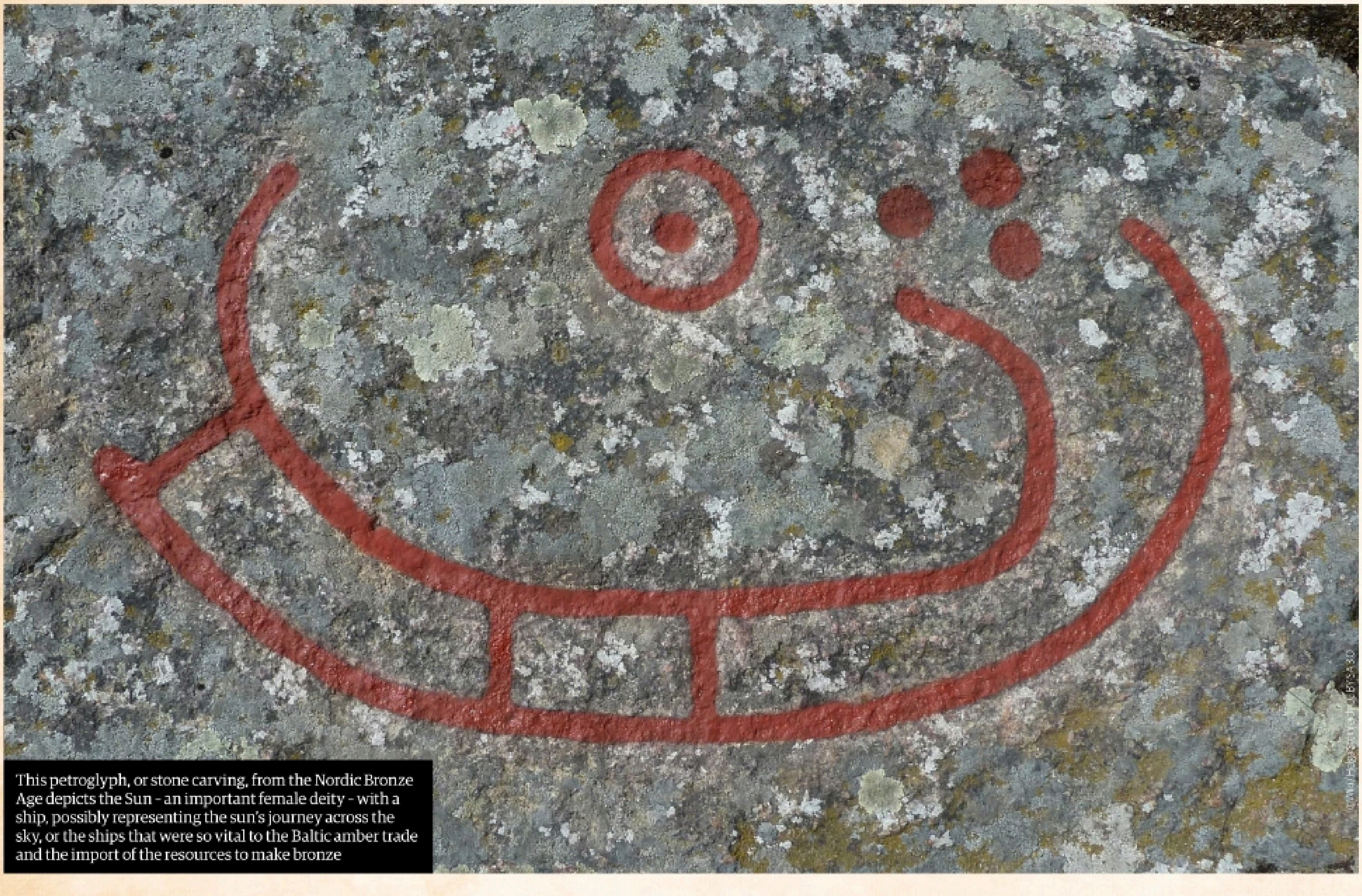
Bronze artefacts of Korean origin are far more rare than those from China. Sometime during the Mumun pottery period, ancient Koreans started to adopt new ways of making goods; plain, coarse pottery replaced old comb-pattern wares as a result of populations migrating to Korea from Manchuria and Siberia. It was during this time, around 1000 BCE, that bronze casting became not popular but at least not unheard of.

Just as Chinese bronze was produced differently compared to other parts of the world, Korean bronze typically contained a higher percentage of zinc than those in neighbouring cultures. Archaeologists have since unearthed a number of artefacts from the period in Gojoseon, including lute-shaped bronze daggers, which have revealed secrets about what is now known as the Liaoning bronze dagger culture that spread through both Korea and China.

THE NORDIC BRONZE AGE

Unlike their desperate, warlike descendents, the people of Bronze Age Scandinavia lived in the arcadian landscape of a warmer climate and a more peaceful culture

Written by **April Madden**

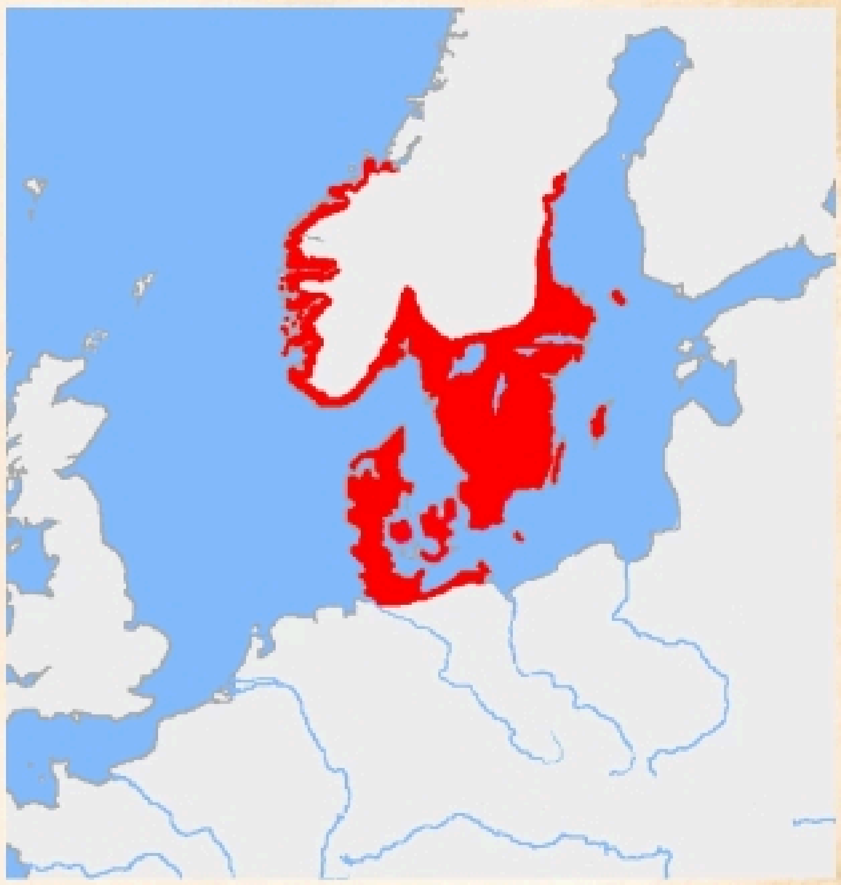


This petroglyph, or stone carving, from the Nordic Bronze Age depicts the Sun - an important female deity - with a ship, possibly representing the sun's journey across the sky, or the ships that were so vital to the Baltic amber trade and the import of the resources to make bronze

If any civilisation had an excuse to feel hard done by over the major upheavals of the Bronze Age, it would be the Nordic cultures of Scandinavia. From around 2700 BCE these Sun-worshipping pastoralists enjoyed a warm climate comparable to that of modern-day Britain, France and Germany. This climatic era is known as the Minoan Warm Period because it coincides with the rise of the iconic Aegean civilisation of the same name, but the Minoans weren't the only Bronze Age culture enjoying gentle weather and the abundant food and attendant rise in living standards that often accompanies it.

The Greeks may have thought that the world had devolved from a mythical golden age, but the people of the Nordic Bronze Age could be forgiven for believing that they lived in one. Their Stone Age ancestors had had the foresight to clear the flattest, most fertile areas of their homelands for ranching and farming. Grapes could be grown throughout the region; evidence of Bronze Age millet farming - a subtropical crop today grown widely in Africa, Asia and the southern United States - has been found in Denmark. No archaeological remains of animal byres, or even parts of general-purpose buildings that were used to house livestock, have been found

> “The people of the Nordic Bronze Age had the highest lactose tolerance of all contemporary Europeans”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ABOVE: The locations of the cultures of the Nordic Bronze Age: Denmark, Sweden and coastal Norway. Iceland and Greenland had not yet been settled

in Scandinavia dating to that period, suggesting that the region was warm enough that cattle could be left outdoors to graze all year round. What are now wind-scoured sandbanks among the Wadden Sea Islands was once an archipelago of lush meadow isles. The linden-dominated forests that still covered the region’s uplands were richly stocked with game, fruit and nuts, and oak for building; the seas, rivers and freshwater lakes that settlements were built next to were teeming with fish that were caught with both hooks and nets. Well-managed, regularly burned heathland provided additional pasturage as well as rich forage for bees. Dairy – an innovative new source of protein that humans had only begun consuming fairly recently – was a major food group: as a matter of fact, DNA testing of grave remains shows that the people of the Nordic Bronze Age had the highest lactose tolerance of all contemporary Europeans.

These warm, idyllic lands of milk and honey can be tantalisingly glimpsed in Norse mythology. In *Völuspá*, the great pre-Christian creation myth of Norse cosmology, the human world of Midgard has its land levelled, ready for farming, by some of the earliest gods. Then “the Sun from the south warmed the stones of Earth, and green was the ground with growing leeks”. The Sun was conceptualised as female in Norse mythology, a concept they shared with their Bronze Age predecessors. Many archaeological finds of the Nordic Bronze Age point to a Sun-worshipping religion centred around a goddess to whom a wide variety of animals – fish, snakes, horses and birds – were sacred. Whether her worshippers called her Sól or Sunna like their descendants did is unknown, because unlike some other Bronze Age civilisations the people of the Nordic Bronze Age didn’t have a writing system of their own. Later the Norse would use runic alphabets such as Elder Futhark, which are suitable for encoding basic information, but the earliest evidence of this and other runic systems dates to the 2nd century CE, hundreds of years after the Bronze Age had ended.

Whether this makes the people of the Nordic Bronze Age pre- or protohistoric is up for debate. The earliest known written record of Scandinavia made by someone from a literate civilisation was from the 4th century BCE and was written by Pytheas of Massalia, an ethnic Greek from a colony located in what is now Marseilles, France. All copies of the manuscript itself have been lost; we only know it from the writings of later scholars, most of whom had a Mediterranean-centric worldview and poured scorn on it. Nonetheless, in his *Things About the Ocean*, Pytheas accurately described the Arctic regions, polar ice, tides and the Moon’s role in them (a negligible phenomenon in the barely tidal Mediterranean, but of vast impact in the northern seas), and the midnight sun. He claimed to have circumnavigated Britain and describes how the people of Belerion (Cornwall) mined and traded tin (although Pytheas was writing long after the end of the Bronze Age, its key components were still important commodities).

He went on to describe ‘Ultima Thule’, the land at the end of the world, beyond the northern ocean. As he was writing centuries before even the earliest colonisation of Iceland and Greenland, which were both later referred to as Thule, it

BUYING TIN

Copper can be found in Sweden and Norway but not in Denmark (to this day Denmark’s mines are located in Greenland, which had not yet been settled during the Nordic Bronze Age), but tin is much harder to come by. So where did the Bronze Age Scandinavians get it?

Many bronze objects from the Nordic Bronze Age are weapon-tools – axes, blades, arrowheads and the like – which could have been used for hunting and harvest as well as for warfare. The form of many of them suggests that agricultural and hunting use were more likely, although it’s probable that they were used in skirmishes between homesteads too.

Very few of these artefacts have been subject to scientific testing to determine the source of the tin used in their manufacture. Germany’s Nebra Sky Disk contains tin and gold from Cornwall, and a pure Cornish tin ingot dating from the Nordic Bronze Age has been found in Scandinavia, suggesting that this is the most likely source. Surprisingly though, of the artefacts that have been tested, many show that the copper used is not from Swedish or Norwegian deposits but from Sardinia, the Iberian Peninsular, and the Tyrol region of the Alps. It’s likely that the people of the Nordic Bronze Age traded precious amber to purchase these resources.

Baltic amber can be harvested from the northern seas but to the Bronze Age Scandinavians’ trading partners in Europe and Asia it was a precious jewel that could be used to purchase the resources for making bronze

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The people of the Nordic Bronze Age had close genetic links with the Corded Ware culture, which populated large tranches of Europe and western Asia during the Neolithic, Copper Age and early Bronze Age

has been suggested that Pytheas' Thule is likely to have been Norway. A later Anatolian-Greek geographer, Strabo, ungraciously allowed that Pytheas "might possibly seem to have made adequate use of the facts as regards the people who live close to the frozen zone, when he says that… the people live on millet and other herbs, and on fruits and roots; and where there are grain and honey, the people get their beverage, also, from them. As for the grain, he says - since they have no pure sunshine - they pound it out in large storehouses, after first gathering in the ears thither; for the threshing floors become useless because of this lack of sunshine and because of the rains."

The fact that the archaeological evidence found throughout Scandinavia ties in so exactly with Pytheas' post-Bronze Age descriptions of Thule points to the people of the Nordic Bronze Age living in a relatively peaceful agrarian society in which little changed for centuries. They lived in widely separated farmsteads rather than villages, with communal longhouses and a few smaller buildings housing extended family groups. Some were wealthier than others; their halls were larger and the hoards they left behind them were packed with the gold rings that later fired the Norse imagination. And even though we can't say for certain what their religion and their inner lives were like because they didn't yet have a writing system of their own to tell us about them, we can infer a lot from context.

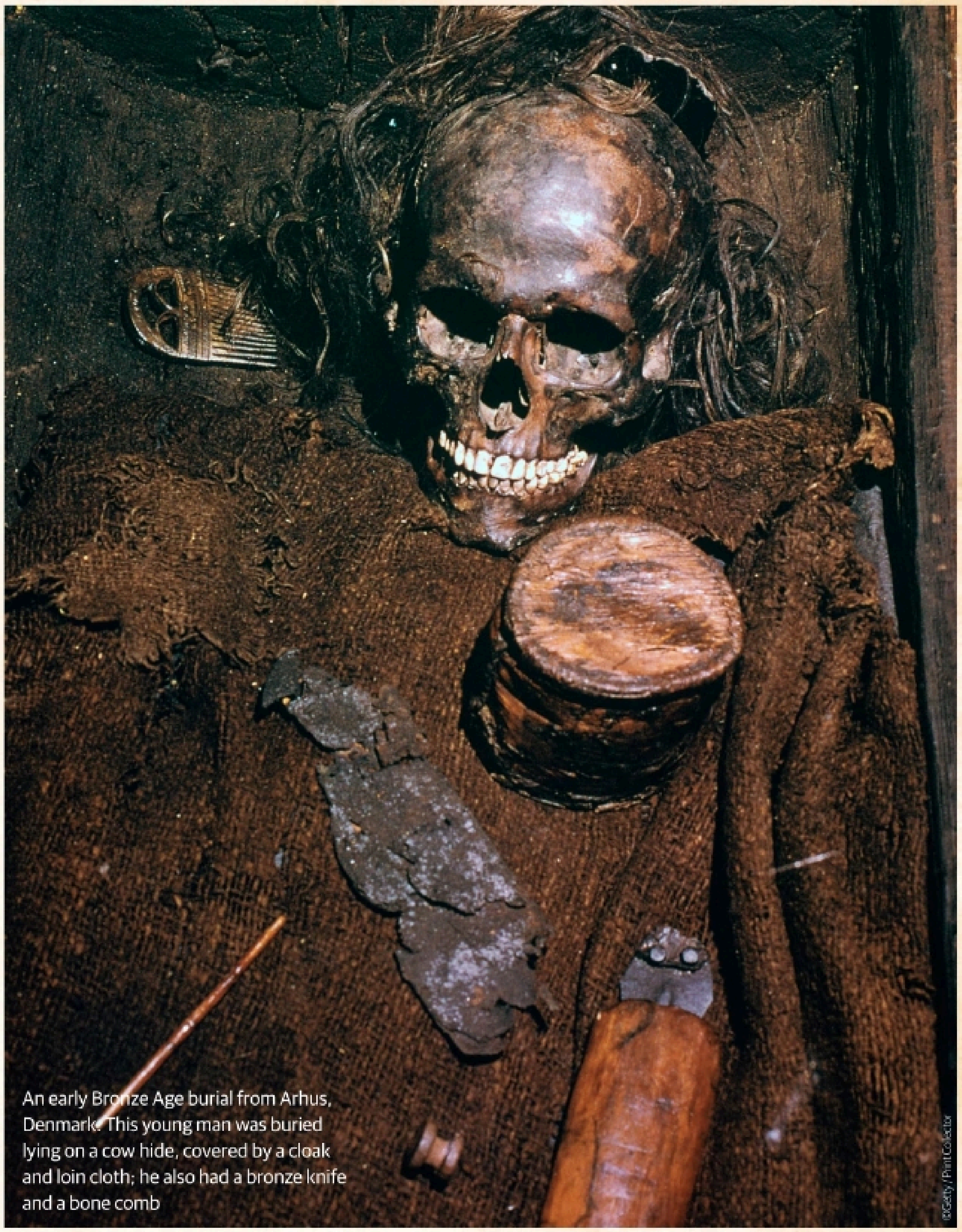
The cloudy, rainy climate that Greek historians, used to boundless "pure" sunshine, found so unusual, goes a long way towards explaining the importance of the Sun to Nordic Bronze Age society and why they would conceptualise it as a goddess to be worshipped and propitiated: the Sun, which vanished almost entirely in the depths of winter, likely symbolised life itself, and certainly nurtured it. Many Nordic Bronze Age artefacts feature designs that depict the Sun travelling across the sky in her horse-drawn chariot, akin to the later Norse Sól being towed across the sky by her horses Árvakr and Alsviðr (Up Early and Very Quick), pursued by the wolf Sköll or Fenrir, who will consume the Sun at Ragnarök, Norse mythology's apocalypse.

The chariot is an interesting device for the people of the Nordic Bronze Age to use in iconography. At the time, it was cutting-edge technology, probably invented by the Sintashta culture of the Eurasian steppes in the late Copper or early Bronze Age, and widely popularised along their nomadic migration routes. There are a wide range of similarities between the people of the Nordic Bronze Age and the Sintashta, including common genetic links to the Corded Ware culture found throughout northern Europe and the borders of Asia in the Neolithic, Copper Age and early Bronze Age, high lactose tolerance, and linguistic and cultural links through the Proto-Indo-Iranian language family. There are

"The Sun, which vanished almost entirely in the depths of winter, likely symbolised life itself"

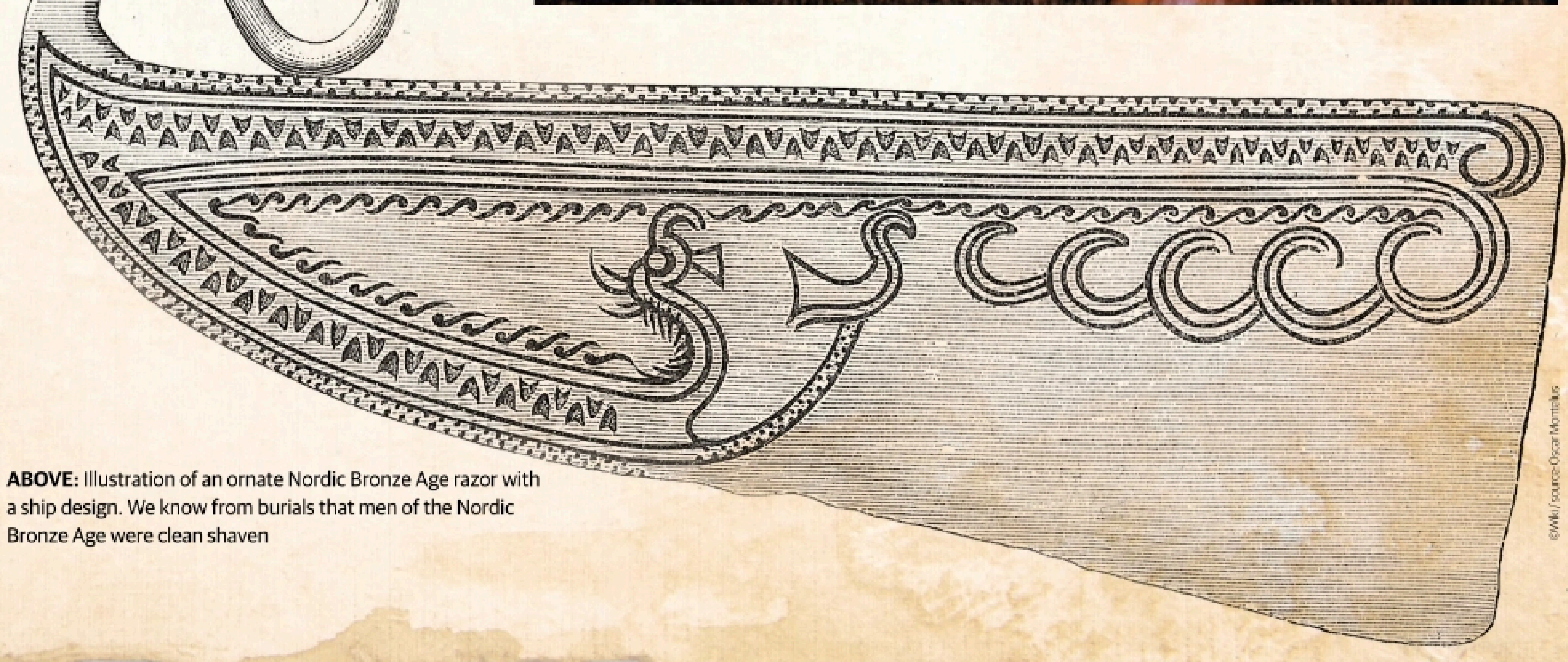
also influences from that language family on the Finno-Ugric language grouping found in northern Asia and north-east Europe, and similar cultural motifs that are shared as far away as India, notably the Vedic dawn goddess Ushas in her golden chariot. From hymns to her in the Rigveda, the ancient Hindu text that is one of the key tools in understanding the connections within Proto-Indo-European cultures, we can guess that the Nordic Bronze Age Sun goddess was probably venerated for similar reasons: as a deity of light, warmth, life, illumination, revelation, renewal, and time.

The seemingly gentle people of the Nordic Bronze Age appear so different to their voracious descendants that it seems astonishing that they're cut from the same genetic and cultural cloth. What brought on such a sea change? In around 850 BCE the Nordic climate began to change, growing colder and wetter. By 650 BCE temperatures had dropped by around two degrees. Crops no longer grew reliably, especially not the sub-tropical millet that had been such a staple of both human and livestock diets. The Minoan Warm Period was at an end, the bountiful Sun goddess turned her face from her northern children, and the people of the Nordic Bronze Age experienced their own version of the Bronze Age Collapse. They would come out of it leaner, hungrier, and desperate for resources. They would come out of it as the Vikings.



An early Bronze Age burial from Arhus, Denmark. This young man was buried lying on a cow hide, covered by a cloak and loin cloth; he also had a bronze knife and a bone comb

©Getty / Print Collector



ABOVE: Illustration of an ornate Nordic Bronze Age razor with a ship design. We know from burials that men of the Nordic Bronze Age were clean shaven

©Wiki / source Oscar Montelius

BRONZE AGE EUROPE

Europe was home to many sophisticated cultures during the Bronze Age

Written by **Marc G DeSantis**

Examples of Corded Ware pottery, dating to around 2500 BCE

©wiki / Einsamer Schutze

The Minoan and Mycenaean civilisations of the Bronze Age Mediterranean today loom large in modern consciousness, and are rightly famous. Elsewhere in Europe, beyond the sunny Aegean Sea, however, lay other cultures that flourished during the Bronze Age. In the far west of the continent, there were the peoples of the so-called megalithic cultures who had built the massive stone structures that dotted the landscape, especially Stonehenge and the standing stones of Carnac in Brittany. They would be joined by newcomers from the east who would profoundly change the way that ancient Europeans lived.

The European Bronze Age began about 3200 BCE when bronze, an alloy of copper (90 per cent) and tin (ten per cent), and tougher than either, became the main material used in weapons and tools. The use of bronze became and remained widespread until around 600 BCE, when it was supplanted by iron. Many new cultures appeared in Europe during these centuries, and they exhibited numerous differences as well as commonalities. Broadly, Bronze Age societies displayed increasing social stratification as wealthy, powerful elites arose out of the large masses of the local populations. Accelerating population growth was a feature of the Bronze Age, and more people meant that more farmland could be brought under cultivation.

Often a successor culture would have as its centre the same area previously dominated by an earlier culture. The people of the predeceding culture had already done the work of clearing the trees in a Europe that was still mostly forest, and this open land made for good pasturage. Since the raising of livestock was one of the surest ways to build wealth in the Bronze Age, it made perfect sense to reuse the same open spaces.

The cultures of Bronze Age Europe were entirely illiterate, so convention has developed that when scholars talk about 'cultures', they use terms for them that the people who lived in ancient times would never have recognised. Often, they are named after archaeological sites, or specific types of pottery, associated most strongly with the culture in question. Grave goods are often the foremost means by which modern scholars can learn about these ancient peoples.

"Grave goods are often the foremost means by which modern scholars can learn about these ancient peoples"

Separate geographical areas were home to distinct cultures. In Italy, for example, the Apennine culture, deriving its name from the peninsula's greatest mountain range, held sway from about 2000 to 800 BCE. Sophisticated pottery with forked handles was one of the Apennine culture's distinctive products. Southern Britain was home to the Wessex culture, which lasted from about 2000 to 1400 BCE. A hallmark feature of the Wessex culture was the burial of the dead beneath barrows, earthen mounds under which bodies, along with plentiful grave goods, were interred.

A bronze sculpture from the Nuragic culture depicting a heavily armed tribal chief

NURAGIC SARDINIA

In Sardinia, lying in the Mediterranean Sea to the west of Italy, we find the Nuragic culture. Named after their high stone towers typically shaped like cones, known as nuraghi, DNA testing has revealed that Sardinians are the most closely related of modern European peoples to the 'First Farmers' who migrated into Europe from Anatolia at some point prior to 6500 BCE. The Nuragic culture flourished on Sardinia from about 1800 to about 300 BCE.

Excavations have revealed a socially stratified culture with groups ruled over by chiefs. Round huts were commonplace homes of the inhabitants, and larger huts served as council chambers. Some nuraghi differed markedly from the towers, being single-storied structures with corridors branching to satellite rooms. The tower nuraghi were used as residences by the local chiefs as well as fortifications, with their height allowing inhabitants to keep watch over the surrounding territory. This suggests that the Nuragic people had something to fear, and had to guard themselves against attack.

CORDED WARE CULTURE

In Central Europe, we see the culture that produced Corded Ware pottery prominent from around 3000 BCE. The Corded Ware people almost certainly represent the westward migration of the Indo-Europeans, or the Yamnaya culture, into Europe from the Pontic-Caspian steppe north of the Black and Caspian Seas in the 4th millennium BCE.

The Corded Ware culture takes its name from its signature pottery, which was embellished by pressing twine into moist clay. The pottery came to be found over a broad swathe of territory, from Russia to Switzerland. DNA analysis of ancient Corded Ware individuals shows in them a strong linkage to modern Europeans. Corded Ware individuals buried in Germany also had about three-quarters of their DNA in common with the Yamnaya peoples of the Eurasian steppe, with the remainder coming from the earlier inhabitants of the region. Modern Europeans are thus strongly related, genetically, to the Yamnaya.

Cultural similarities between the Corded Ware and Yamnaya cultures included burials beneath big mounds, known as kurgans, on the steppe, a heavy reliance on horses, herding, and a male-dominated warrior culture, as indicated by interment of the dead with weapons.

BELL BEAKER CULTURE

The Bell Beaker culture succeeded the Corded Ware culture, from which it probably developed, around 2800 BCE. It takes its name from the signature pottery associated with it, a bell-shaped drinking cup. The dead were often buried with these beakers, as well as bronze daggers and battle axes, indicating the presence of a warrior elite. The ubiquitous presence of axes as grave goods has also supplied the Bell Beakers with an alternate title, the Battle Axe culture.

The Bell Beaker people came to predominate over Central Europe, and some migrated to the British Isles around 2500 BCE, where they had a massive demographic impact. Bronze Age skeletons from Britain and Ireland after this time show that some 90 per cent of their DNA is Bell Beaker in origin, and thus further back, to the Yamnaya people of the steppe, with only about ten per cent deriving from the First Farmers, the great wave of agriculture-practicing migrants from Anatolia. The Bell Beaker culture would in turn be superseded by another culture that differed radically in its burial practices.

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STONEHENGE IN THE BRONZE AGE

The great monument known as Stonehenge, on Salisbury Plain in England, was originally constructed during the Neolithic, or 'New Stone Age', an era that lasted from roughly 4000 to 1700 BCE. The structure of standing stones remained in use during the subsequent Bronze Age.

In Britain, the Wessex culture followed the Bell Beaker culture, and lasted from about 2100 to 1500 BCE. The people of the Wessex culture made Stonehenge their own. Wessex chieftains had sufficient power to remodel the structure in the late archaeological phase known as Stonehenge III. The double circle of bluestones that had previously been on the site were taken away. Sarsen stones were added, along with the four Station Stones and the Slaughter Stone. The aforementioned bluestones were later put back, and are still found there today.

The warrior chieftains who stood atop the Wessex society had some similarities to those of Mycenae, which flourished in Greece in the later Bronze Age. They did not rule from cities, but from fortified palaces, just as the Mycenaean kings did, but they lacked the strong control over their societies that the Greek monarchs enjoyed, and Wessex craftsmen probably moved about quite freely. The manpower necessary to remake Stonehenge was instead likely drawn from among the local farmers.

Stonehenge, originally a Neolithic structure, was rebuilt over the centuries, with the last alterations made in the Bronze Age

©Wiki / garethwiscombe

THE URNFIELD CULTURE

The Late Bronze Age saw the formation of the Urnfield culture in Central Europe, beginning around 1300 BCE and lasting until about 800 BCE. It takes its name from the prevalence of deposits of burial urns containing the cremated ashes of the dead. These urns were interred in pits inside cemeteries within clearly demarcated fields. Other items would often be buried beside the urns, such as bronze knives, beads, cups, bowls and pots.

This burial practice was novel and is thought to indicate a significant break with earlier cultures. Previously, a body had been buried beneath a tumulus, an artificial mound, itself a strong indicator of an Indo-European presence. In the Urnfield culture, however, cremation became the new norm, and it is probable that the rise of the use of burial urns among the Urnfield people represents a substantial change in the spiritual beliefs of the inhabitants of Bronze Age Europe.

Urnfield cemeteries are found in large numbers across Central Europe, especially in Germany and Poland, with examples also being found as far afield as Italy, Spain, France and elsewhere. The many cemeteries, often containing hundreds of individual burial urns, suggest that there was a large population residing in the areas around them. Agriculture was practiced by the Urnfield people, centring on wheat and cattle-raising.

An innovation in burial practice was not the only change to be seen with the advent of the Urnfielders; there was also a rise in the building of hillforts around 1100 BCE. Other forts were built on flat ground and these were encircled with protective ramparts and ditches. The appearance of widespread fortifications strongly suggests that the people of the Urnfield Period had to protect themselves from either their neighbours, or from raiders from further off.

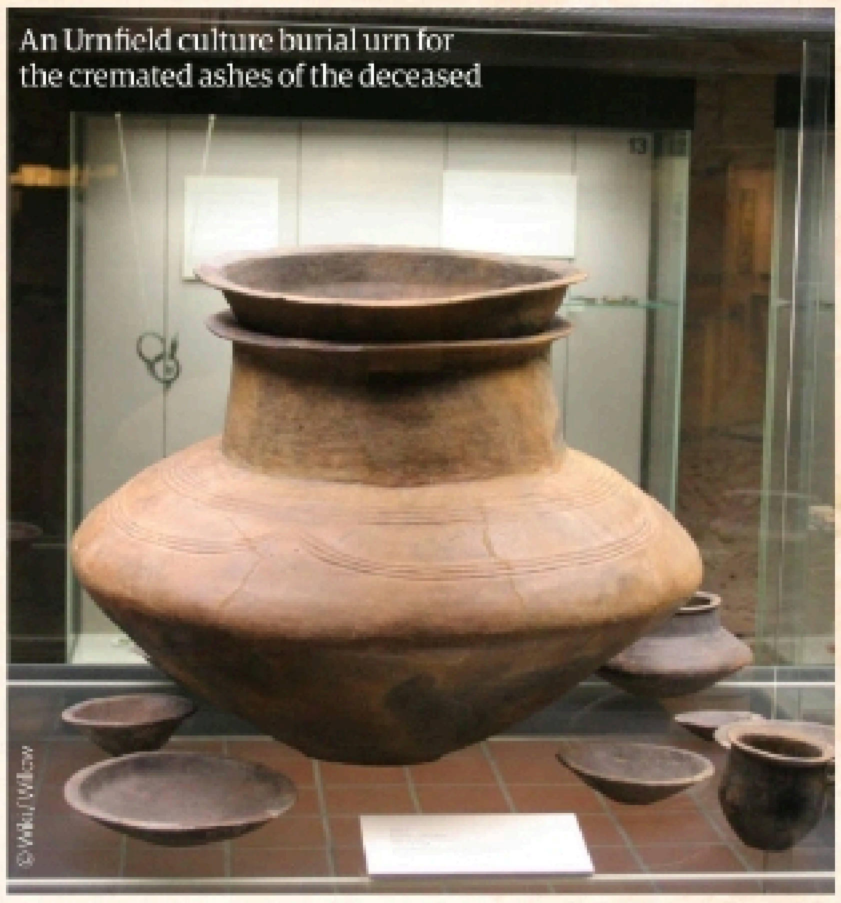
One significant commodity that was likely traded by Urnfielders far and wide was salt, with a major production site being located at Halstatt in Austria. Elites who exercised control over centres of salt production almost certainly grew wealthy as a result.

Metalworking expanded in volume and the types of metal goods available increased in number. Long-distance trade with Mycenaean Greece is also in evidence. Many bronze weapons have been found at Urnfield sites, including swords, spears, daggers and arrowheads. For protection, Urnfield warriors wore armour of bronze and carried shields.

INTO THE IRON AGE

It is probable that the people of the Urnfield culture were the ancestors of the Celts, an Indo-European people who would come to dominate northern Europe in the succeeding Iron Age. Like the Urnfielders, the Celts were notable for their use of hillforts. Similarly, they also possessed a strong warrior tradition and were talented metalworkers.

Early examples of northern European iron objects have been found at Halstatt, Austria. The Celtic culture that succeeded that of the Urnfield, and extended from roughly the 8th century to the 5th centuries BCE, the Halstatt, takes its name from this site. The Celts would enter into the knowledge of the literate Greeks and Romans during this period as a result of conquest, and they would play influential roles in the histories of both Mediterranean peoples.



An Urnfield culture burial urn for the cremated ashes of the deceased

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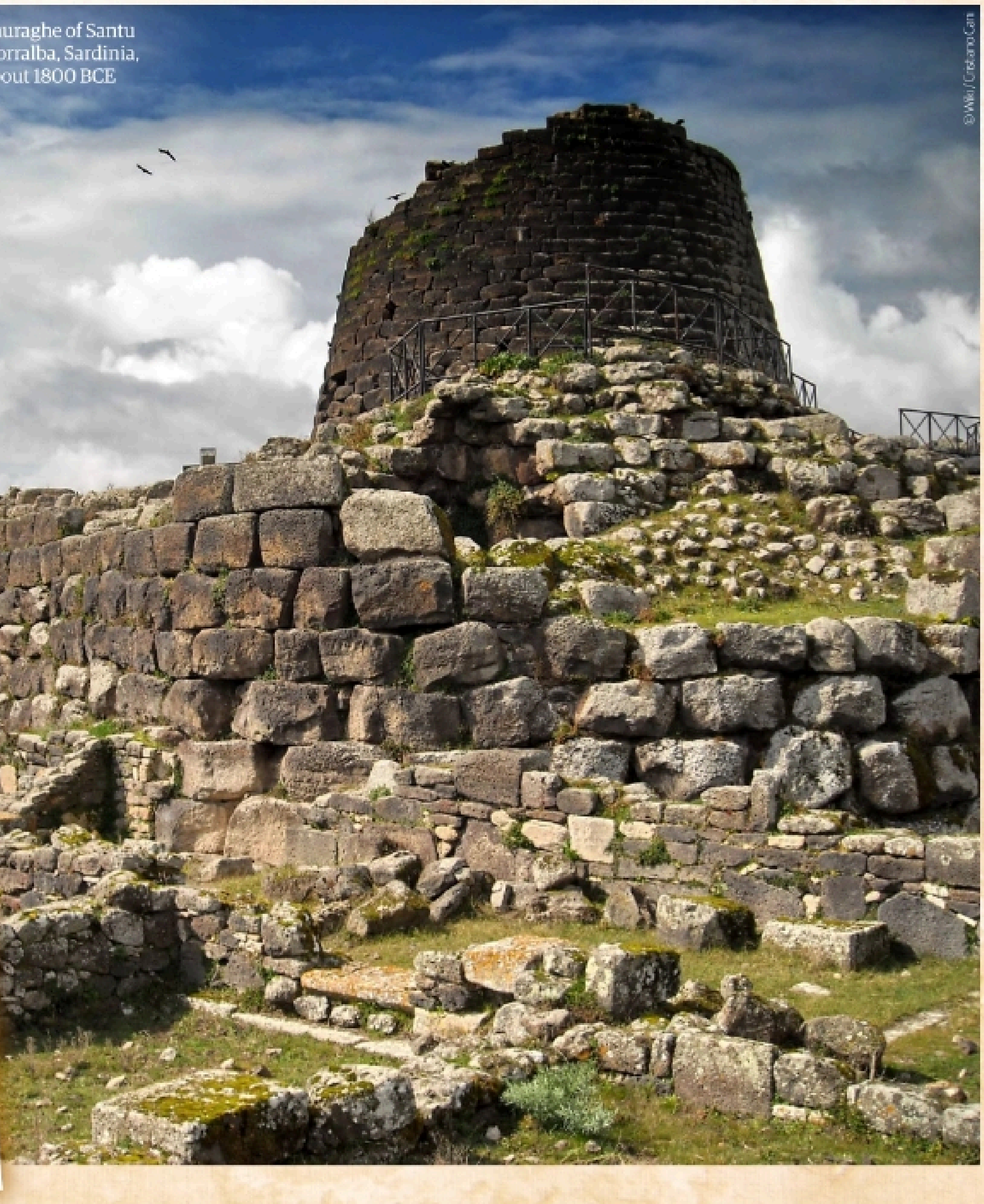
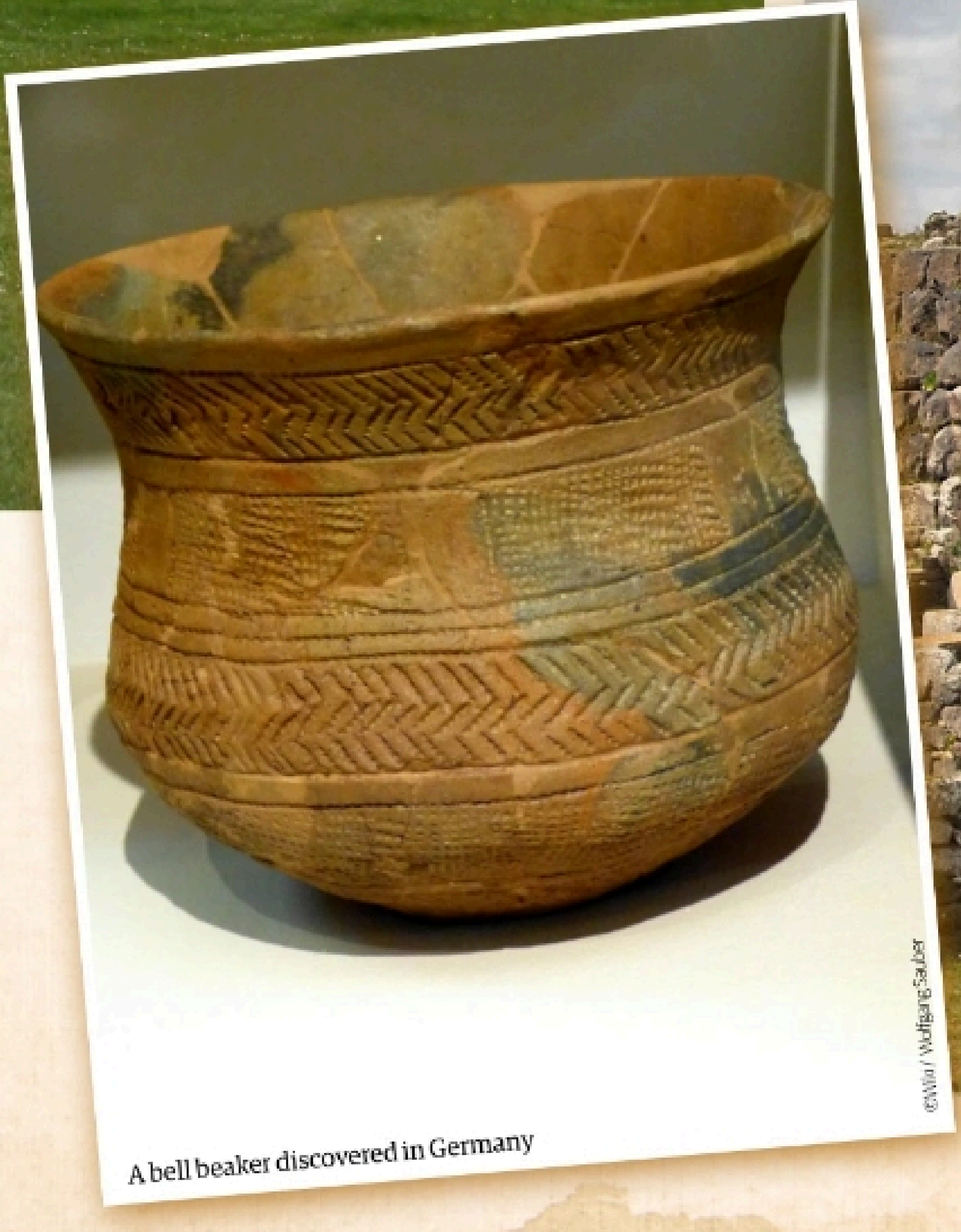


The tower nuraghe of Santu Antine in Torralba, Sardinia, dating to about 1800 BCE

©Wiki / Cristiano Cani



A bell beaker discovered in Germany

©Wiki / Wolfgang Sauber

BRONZE AGE COLLAPSE

Across the Mediterranean world cities fell into ruin at around the same time. Who or what destroyed them?

Written by **Ben Gazur**

Something has gone terribly wrong. The city had once been a bustling metropolis where thousands of people had traded, worshipped and celebrated together. Now the marketplace is a smouldering ruin. Stout buildings have collapsed. Under the piles of stones are the bodies of women and children. Embedded in the city walls are bronze arrowheads. The fire that is raging will deposit a layer of ash over one metre deep across the entire site, where it will remain until archaeologists excavate the city 3,000 years later.

The above could have been written about any of dozens of population centres across the western Mediterranean in the years 1200-1150 BCE. In that time cities would be abandoned, many never to be resettled. This was the Late Bronze Age Collapse - and what caused it remains a mystery.

RUINED CITIES

Every town and city in Anatolia that was not under the control of the Assyrians in the 12th century BCE has been found to have a layer of destruction in it. These layers of ash and rubble show that in some way the site underwent a catastrophic period of disruption. The Hittites, who had ruled the region for centuries, were apparently unable to stop the destruction - their own capital, Hattusa, was burned down after what appears to have been a long period of Hittite decline. It would not be resettled for hundreds of years.

In Greece, the great cities of Mycenae, Tiryns, Pylos and Thebes were all destroyed around the same time. Here the population centres had formed around the palaces of kings, and the ruins of those palaces tell us of the ruin of the Greek mainland. Some sites like Mycenae had already suffered earthquake damage in the preceding century but had recovered. What occurred around 1190 BCE left the wooden beams of the palace reduced to carbon and scorched the stones so badly that many walls were left off kilter. At Pylos, clay tablets marked with Linear B texts were baked in the fires that ravaged the palace. Some of these tablets mention "watchers of the sea", although we will never know what it was they were watching for.

The city of Troy, which survived in memory due to the tales of the famous war that destroyed it, was long thought to be legendary. Since its discovery in Turkey, archaeologists have been able to identify many layers of habitation at the site. Some are separated by destruction layers and one layer, known as Troy VIIA, is of interest because it is in this period that the city suffered an invasion. Arrowheads can still be found where they struck the walls, and unburied skeletons that were caught in a fire litter the area.

Even where destruction is not obvious there can be clear signs of change happening in a society. In Ashkelon, in modern-day Israel, it is clear that the city went from being an Egyptian outpost to a home for the Philistines. The change can be traced from the sudden appearance of new types of ceramic and artistic styles. Other Philistine cities show clear evidence of burning around this time.

The busy trading city of Ugarit on the Syrian coast has proved to be a fruitful source of evidence about the Bronze Age Collapse. The huge terraces of the city are found in shapeless heaps, while plaster from the walls was burned black. Piles of ash and rubble gathered in drifts two metres thick. Arrowheads litter the streets and the people who lived in the city fled, never to return. We know this because they buried their precious things and were unable to retrieve them. Thousands of texts from Ugarit have been deciphered and many of them date to just before the destruction of the city between 1190 and 1185 BCE. One letter written to the king of Cyprus from the king of Ugarit is a cry for help: "The ships of the enemy have been coming. They have been burning down my villages and have done evil things to the country.

A layer of burned destruction at many sites tells archaeologists many cities met a catastrophic fate, but it is not always clear what caused it

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[Do you] not know that all my troops and chariots are in Hatti and that all my ships are in Lukka? Thus, the country is abandoned to itself. May you know it: the seven ships of the enemy that came here inflicted much damage upon us."

An army from Carchemish was sent to Ugarit's aid but apparently too late. One of the last letters from Ugarit tells us: "When your messenger arrived, the army was humiliated and the city was sacked. Our food on the threshing floors was burnt and the vineyards were also destroyed. Our city is sacked. May you know it! May you know it!"

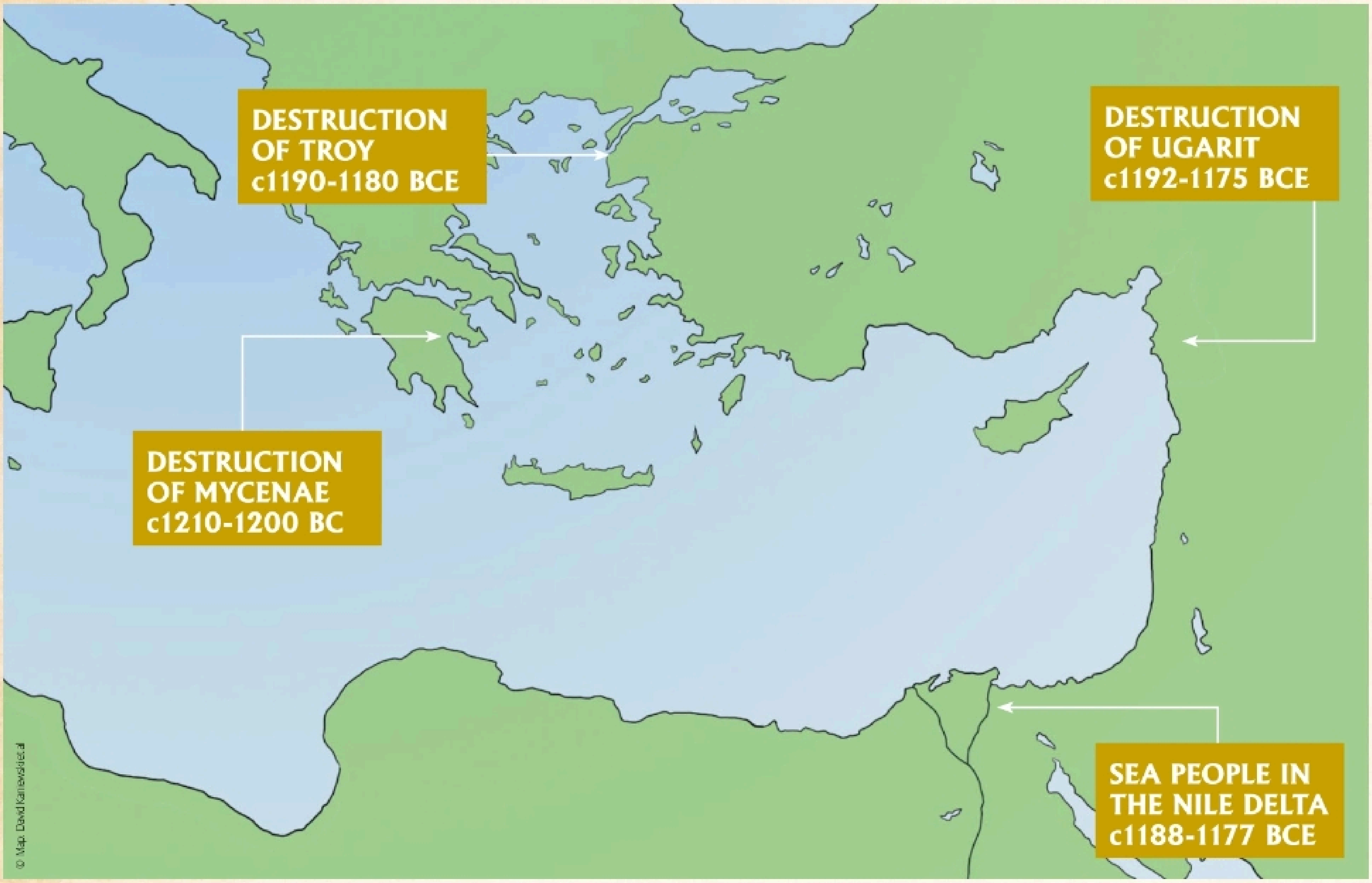
Who, or what, led to this wave of desolation across so much of the Bronze Age Middle East? Who were the people in these ships, and did they help bring about the end of the era?

THE ENEMY FROM THE SEA

Ever since the engravings from the mortuary temple of Ramesses III were rediscovered showing his victory over a group of enemies from the sea,

FOLLOWING THE DESTRUCTION

By studying the destruction of cities, it has been possible to recreate putative routes followed by the Sea Peoples in their invasions


DESTRUCTION OF TROY c1190-1180 BCE
DESTRUCTION OF UGARIT c1192-1175 BCE
DESTRUCTION OF MYCENAE c1210-1200 BC
SEA PEOPLE IN THE NILE DELTA c1188-1177 BCE

© Map: David Kaniewski et al

scholars have been intrigued by who this foe could have been. In the texts accompanying the pictures, the enemy seen arriving in a fleet of ships are simply described as being from "northern countries". Since Egypt traded with many of the countries to the north of it and into the Mediterranean, it is puzzling that they should not say where this enemy came from.

In fact the Sea Peoples, as this group became known, are referred to several times in Egyptian texts and there are hints about their origins. Some of the people collectively called Sea Peoples are given names like the Denyen, described as "in their isles" and the Sherdan "of the sea". Many of the names given by the Egyptians seem to relate to known people - the Peleset are probably the Philistines and the Lukka were likely the Lycians. Some are mentioned in multiple sources from Egypt. We are told from inscriptions from Ramesses II that he had defeated the "Sherden whom no one had ever known how to combat, they came boldly sailing in their warships from the midst of the sea, none being able to withstand them". Later it seems the captured Sherden joined forces with Ramesses II and ended up fighting alongside him.

Under Pharaoh Merneptah in the late 12th century BCE we hear of his struggles with a confederation of enemies known as the Nine Bows. This group of peoples contains several that were mentioned by Ramesses II and would be mentioned by Ramesses III. The Nine Bows devastated the land; "It was abandoned as pasture for cattle." When the Nine Bows came to Egypt, however, Merneptah tells us he defeated them handily - cutting off the hands or penises of his dead enemies to get an accurate count.

It is the incursion of the Sea Peoples under Ramesses III in 1175 BCE that has attracted the most attention from historians as it may be related to the sudden fall of so many population centres. In an inscription at Medinet Habu we are told that huge numbers of people were moving from the north and east, and several tribe names of the Sea Peoples are listed among them. "The foreign countries made a conspiracy in their islands. All at once the lands were removed and scattered in the fray. No land could stand before their arms, from Khatte, Qode, Carchemish, Arzawa, and Alashiya on, being cut off at one time... They desolated its people, and its land was like that which has never come into being. They were coming forward towards Egypt."

The confederation described by Ramesses III had apparently destroyed many great cities of the Mediterranean and Middle East on their way to Egypt. The carvings of the enemy show women, children and wagons on the move - this was not simply an army, but a population being transported. Several battles by land and sea are mentioned over several years of campaign, but the Sea Peoples were apparently driven from the land and from history. Egypt was spared the worst of the Bronze Age collapse.

The identification of the individual groups within the Sea Peoples remains controversial to this day. Were they people from the Aegean sea? Were they barbarians from the far north? Were they dispossessed local tribes? We cannot say for certain, but it does seem that during the Bronze Age collapse there was a large-scale movement of people. Were the Sea Peoples the cause of the collapse of the Bronze Age, though, or merely a symptom of it?

The Hittite capital Hattusa, guarded by these lion gates, underwent a long period of decline before being burned down

© Wiki/ Bernard Gagnon

> "The identification of the individual groups within the Sea Peoples remains controversial to this day"

CAUSES OF THE COLLAPSE

The Sea Peoples have traditionally been something of a bogeyman to Bronze Age archaeologists. Wherever a city is found in ruins it can be suggested that the Sea Peoples did it, even if the destruction took place many miles inland. More recently, many destroyed towns and cities have been reassessed in the light of new evidence and thus other possible causes of the Bronze Age Collapse have been put forward.

Earthquakes strike the regions hit by the collapse with grim regularity. At archaeological sites the traces of earthquakes can often be found littered through the historical record. It can be hard to judge from a pile of overturned walls whether a city was destroyed by besiegers or an earthquake, but sometimes the foundations of buildings are found twisted in a way only possible through the upheaval of an earthquake. When the cities came tumbling down around their inhabitants' heads it must have seemed like the end of the world, but it wasn't. In many sites, like Ugarit, where we see evidence of earthquakes we also see evidence of rebuilding. After the great earthquake at Troy, shanty towns sprang up within the walls and large homes were split up to create smaller ones for multiple families to live in.

Some historians have suggested that volcanoes may have played their part in the Bronze Age Collapse. The eruption of the volcano on the island of Thera around 1600 BCE would have been apocalyptic to those living in the area. The coasts of Minoan Crete were struck by huge tsunamis and much of their civilisation was destroyed, yet the Minoans survived and rebuilt.

But a volcano called Hekla in Iceland has also been blamed for contributing to the fall of the Bronze Age. When it erupted, it blasted 7.3 cubic kilometres of rock into the atmosphere. Around the northern hemisphere, evidence from tree rings has been found that shows temperatures dropped for 18 years afterwards as the dust blocked out the Sun. The ecological changes and harm to food productivity could well have driven people to leave their homes in search of richer agricultural land. Unfortunately the eruption seems to have taken place too late, around 1000 BCE, to have been a cause of the collapse, though it may have contributed to the slow recovery in many areas.

Climactic change may well have been one of the causes of mass migrations that could have pushed the Sea Peoples south. Studies of pollen from the bottom of the Sea of Galilee have shown that from 1250 to 1100 BCE the area suffered a series of intense droughts. Pollen from plants that had adapted to semi-arid conditions proliferated during this period. The hard scrabble of most people to produce enough food for themselves would have become that much more difficult during this time.

We do know that famines occurred in the period immediately preceding the Bronze Age collapse. One Hittite queen, Puduhepa, wrote to Ramesses II with the simple message: "I have no grain in my lands." This may not have been much of a problem at the time for the Hittites as they could afford to import the grains that they were lacking. A later record from Egypt says that grain was sent "to keep this land of Hatti [the Hittites]

THE TROJAN WAR

Until the discovery of Troy, much in the Homeric epics the *Iliad* and the *Odyssey* was thought to be simply fantastical. Ever since Heinrich Schliemann began to excavate Troy, however, people have wondered how much of the stories are true. Was there a Trojan War, and was it related to the Bronze Age Collapse?

From sources as disparate as Hittite texts, poetry from Luwia and the archaeological record, we know of several wars that could fit the bill. Some historians believe the Ahhiyawa mentioned in Hittite texts were the ancient Mycenaeans, and it seems they had a habit of getting mixed up with trouble in Asia. Mycenaean swords have been found in Hittite territory, so it is possible that the Mycenaeans, possibly at the head of a coalition of peoples from Greece, did strike at the city of Troy.

It is impossible, however, to clearly link a Greek attack on Troy with any of the levels of destruction found in the ruins of the city. With the ability to launch armies on their ships, the Greeks of the Bronze Age could well have contributed their strength to the Sea Peoples that bedevilled the region at the time of the Bronze Age Collapse. The story of the fall of Troy could well be the story of the end of the Bronze Age.

Schliemann, who discovered the remains of Troy, also thought he had found a mask of Agamemnon, the king of Mycenae who attacked Troy

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alive". For others, though, food scarcity may have been a factor in pushing the Sea Peoples to war with Ramesses II. We know that Mycenaean and Canaanite goods made their way to Egypt to be traded for grain; if those trade routes were cut, then starvation could easily result.

Even in the ancient world there were stories of famines driving people to new lands. Herodotus records how after an 18-year famine, half of the Lydian population left their native land and crossed the sea in ships to live in Italy.

We do know that the great powers around the time of the Bronze Age collapse were warring with one another, which must have stressed the trade routes that were so vital in supplying nations with their needs. Shutruk-Nahhunte ruled Elam (today western Iran) from 1190 to 1155 BCE, covering much of the period of Bronze Age collapse. In a letter found in Babylon, he wrote to the city: "Why do I not sit on the throne of Babylonia?" He threatened to utterly pull down their cities and cut down their fruit trees unless they made him king – and he followed through on his threats, placing a puppet ruler on their throne.

With war and the movements of large numbers of people, trade routes would have been heavily disrupted. Tin, one of the most valuable and important commodities, had to be transported from distant lands; if it became unavailable, bronze for weapons and armour could not be made. Any nation without an armed army would have found itself sorely trying to survive the upheavals of the age. Some have even suggested that it was the failure of the tin trade that caused the Bronze Age Collapse. Since we have such little information about tin mining in the Bronze Age, it is entirely possible that sources of tin ran dry during this time.

COMETS AND COLLAPSE

In 1998, Professor Mike Baillie published a paper suggesting that the Bronze Age Collapse could have been caused by fragments of a comet striking the Earth. By examining ancient trees and studying their growth rings, he was able to reveal periods in which the trees had grown poorly.

With a period of low growth around 1159 BCE suggesting a clear climatic catastrophe, it would be possible to link all the effects of a depressed ecosystem such as crop failure and drought to the fall of a number of Bronze Age societies. While it would be possible for volcanoes to launch enough dust into the atmosphere to cool the planet, another possibility is that a meteor or comet strike did the same thing. Records from the Shang dynasty in China around 1100 BCE describe a comet coming as an omen. Had a fragment of that comet hit the Earth could it have caused the collapse of the Bronze Age?

Almost certainly not, but it is a fascinating possibility. It deserves consideration, though, as it at least teaches us to examine all the evidence available to us and all the potential meanings of it.

Comets have long been associated with calamities in many cultures and it has even been suggested that one brought an end to the Bronze Age

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The Sea Peoples, a group of outside invaders, shown here being repulsed by Pharaoh Ramesses III have long been considered the main cause of the Bronze Age Collapse

© Getty / DEA / ICAS94

Currently the best guess as to what caused the collapse of the Bronze Age is called general systems collapse. Complex systems can be incredibly resilient in the face of disruption; an ecosystem and an economy can self-regulate. Push them in some way and they can adjust to the new situation or even work to counter the new pressure. But all systems can be pushed too far – if too many changes are made at the same time, then the whole network of interactions can collapse. It may well be that the Late Bronze Age saw a general failure of the social systems that had supported Bronze Age kingdoms.

Yet for all the calamities of the Bronze Age collapse, it was not the end of history. The end of one era was just the start of another: the Iron Age was beginning.

THE COMING OF IRON

Just as the Bronze Age emerged around the world at different times, so too did the Iron Age. Iron had long been known as a valuable metal, but the earliest iron objects were crafted from iron that fell from the sky in the form of meteorites. Iron beads from Egypt dating to 3200 BCE, before the common use of bronze, were found to be made from meteoric iron. Millennia later it remained a high status material when King Tutankhamun was buried with a dagger made from a meteorite.

One of the earliest smelted iron items was a dagger discovered in a Hittite tomb dating from 2500 BCE, and indeed the Hittite Empire's use of iron has been cited as one of the causes of its sudden rise to power in the region. The Hittites were regularly using iron weapons by around 1300 BCE, but it would take much longer for iron to replace bronze entirely.

Even as the Hittites were transitioning to iron usage, however, they were contending with armies like the Egyptians who still used bronze swords. Though iron is lighter and stronger than bronze, it did not have so much of an edge over bronze-edged weapons that it swept them from the field immediately. Being stabbed with a bronze sword has much the same effect as being stabbed by an iron one.

The high temperatures required to smelt iron from its ores meant that in many situations it remained easier to work with bronze. It may well be that the Bronze Age Collapse pushed humanity into the Iron Age – if the supply of tin failed due to the chaos of the collapse, then people would have had to turn to other metals to work with. The fall of the Hittites could have spread the knowledge of how to work with iron to other states.

Taking the knowledge of alloys that had been used in the creation of bronze, it was possible for humans now to craft ever more useful mixtures of metal. The wrought iron of the early Iron Age would give way to steel, and from that invention came many of the innovations we still rely on today. Modern-day foundries are no less wonderful than those of our earliest ancestors who first saw metal pouring from rocks.

Shutruk-Nahhunte, king of Elam, launched an attack on the city of Babylon and war between the great states created disruption of trade and agriculture

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"Some have even suggested that it was the failure of the tin trade that caused the Bronze Age collapse"

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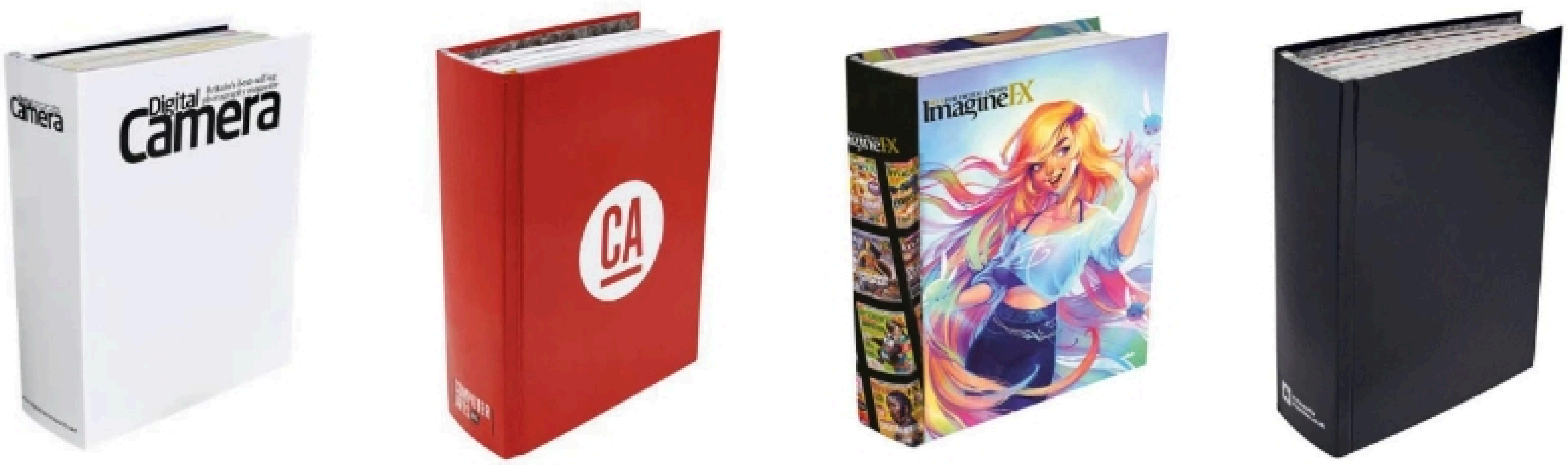

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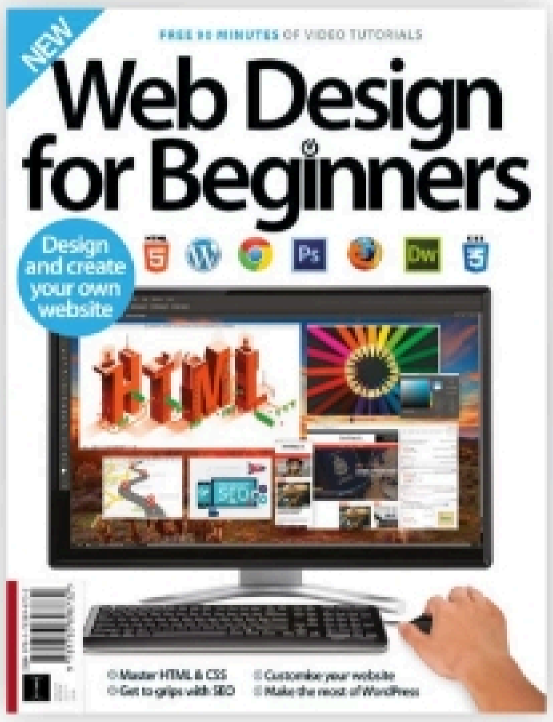

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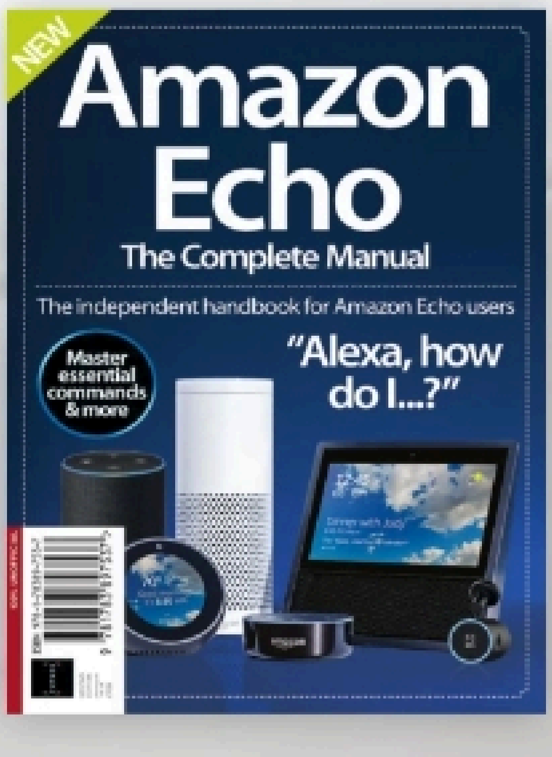

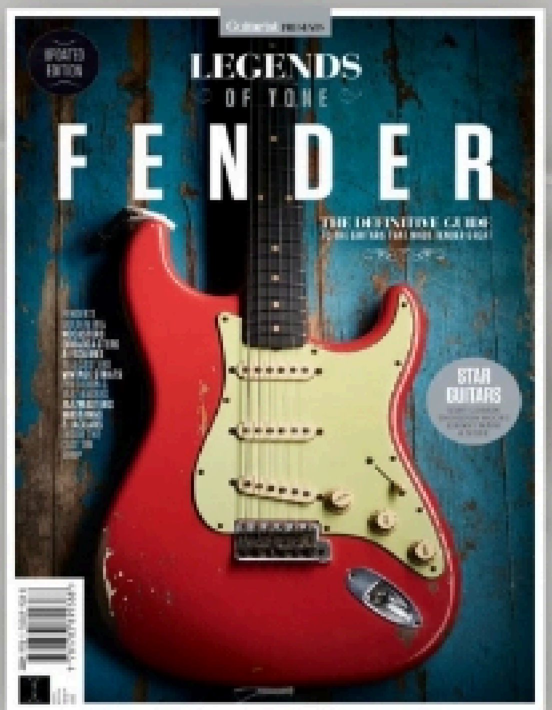

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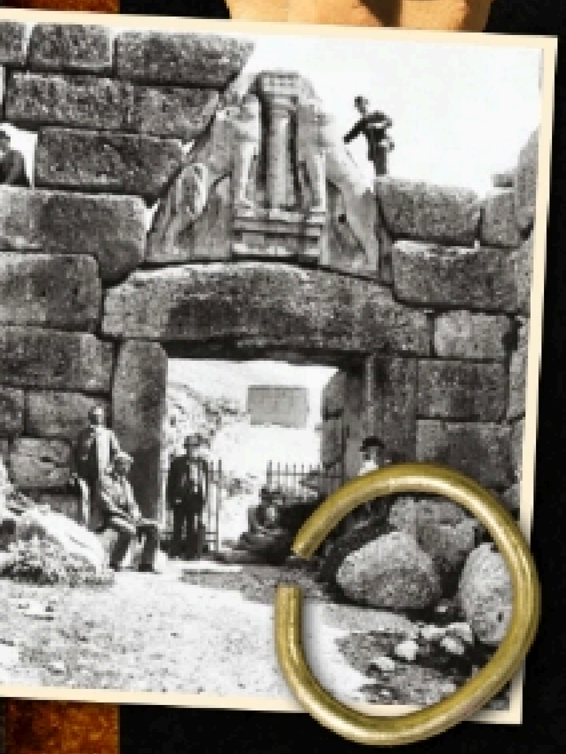

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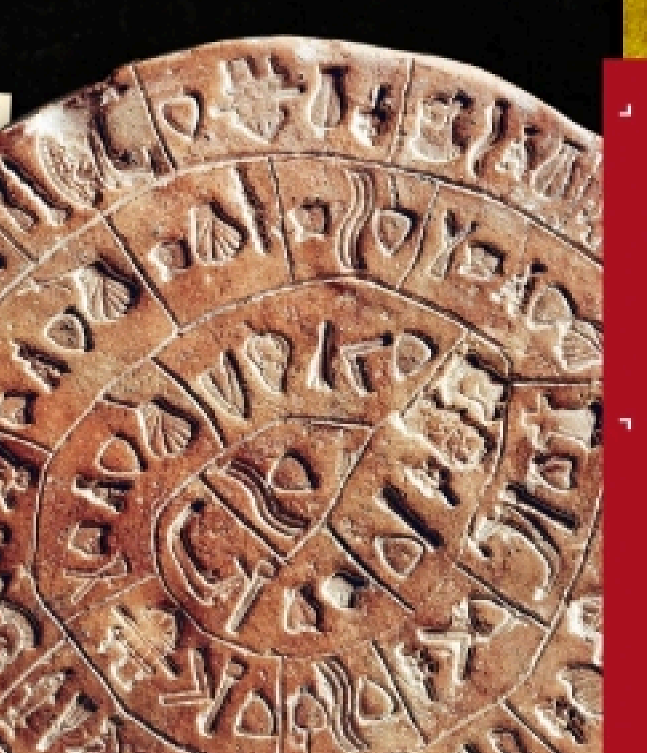

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